MANITOBA PUBLIC UTILITIES BOARD

Re: MANITOBA HYDRO

BUSINESS OPERATIONS, CAPITAL

AND ASSET MANAGEMENT

TECHNICAL CONFERENCE

Greg Barnlund - Facilitator

HELD AT:

Public Utilities Board

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Pages 1 to 159

APPEARANCES

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Brady Ryall	)
Chris Oakley	)
Alex McQuarrie	)
Patti Ramage	)Manitoba Hydro
Joel Wortley	)
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--- Upon commencing at 9:03 a.m.

OPENING COMMENTS BY THE FACILITATOR:

THE FACILITATOR: Good morning, ladies and gentlemen in attendance. I welcome you to Manitoba Hydro's business operations, capital, and asset management technical conference.

And I'm just going to have a few opening remarks myself. I'm Greg Barnlund, director of rates and regulatory affairs. With me today on the other end of the table is Patti Ramage, our legal counsel.

And the main speaker today will be Joel Wortley, who's our director of strategic business integration, which is a new position that we've created here this year that is going to have an overall responsibility for reviewing capital and capital investment activities as we go forward.

The purpose of our workshop today -- or, sorry, of our technical conference today -- is to, I think, be able to kind of bridge any communication gaps we might have, or develop a common understanding of the subject matter that we're dealing with here with respect to this part of our general rate application.

In the 2015 GRA, the issues of asset condition and asset management were first introduced before the Public Utilities Board here in Manitoba. And it was a fairly thorough review of the subject matter, but from our perspective, it was probably burdened at times with kind of the terms, and the jargon, and the vocabulary that is used specific to this part of the industry.

And in advance of the Information Request round, we had proposed that we host this technical conference to be able to explain what Manitoba Hydro is doing in that area with regards to overall investment planning, asset management, asset condition studies, and how all these things fit together, and to be able to communicate how -- what -- what our names are for these -- for these things, so that people have a -- a common understanding of how we're addressing this matter, and so that when Information Requests are being formulated, that there is a better opportunity to formulate a sound Information Request, that we understand what's being asked, and we can provide a better answer in that regard.

Otherwise, I mean, we'll -- we would get an Information Request, and typically then, if we

required clarification, we'd have to take time out from the process at that point in time, contact the -- the party that was asking the question, and have some discussion to be able to clarify that.

So our intent here is to be able to sort of do that in advance to be able to make sure that we have a -- a better understanding of what we're -- what we're speaking of here in advance.

And I think that the difficulty with a session like this is that the audience has got a varying level of -- of experience with regards to asset condition and asset manage -- management matters.

Certainly some of us in the room are experts in that area. Others of us in the room are generalists, or we are involved in the regulatory process, and we ourselves probably aren't as familiar and as -- as comfortable with the subject matter that we're talking about.

And so we're trying to fill in those gaps here today, if you would, and be able to provide a common level of understanding in terms of what we're referring to in our application so that we can facilitate the -- the examination of that evidence in a more productive manner.

And I reflect on the remarks of the Chairman yesterday when we talked about this in our session in terms of our oral argument. And the Chairman himself mentioned that -- that they are supportive of trying to introduce new steps to make the process more efficient. Hopefully they will work. They may not work the first time. We may learn from this year and, you know, improve them later on.

So that's -- we really take a lot of heart, in the courage that the Public Utilities Board has in terms of trying something new to be able to address some of the process that we deal with on the regulatory front. And we, you know, want to try and make this as productive and as useful a session as possible.

So to that end, there's a presentation that Mr. Wortley will be going through. Please, feel free -- this is an informal interactive type session so, please, feel free to raise your hand or turn on your microphone at any time. If you have a question pose that question. Mr. Wortley can provide you an answer, or else if there's something that, you know, a matter of clarification that we can provide that will be the case.

And we will just kind of carry on in

that fashion throughout -- throughout our session here. I'm not sure we'll require the whole day. We've got coffee that will be available at 10:15. We can break for coffee at 10:15. We also have lunch coming in -- being served in -- in the boardroom here at 12 noon. If we go into the afternoon, or how far we go into the afternoon depends on, you know, the pace of which we go through this material today.

But we want to be here to be able to provide that value to Intervenors, and -- and the Board counsel -- sorry, and the Board advisors in that regard. So that's our intent today. We -- we don't want to sequester people here for the whole day if we don't have to, but we'll take as much time as we need to be able to go through the material.

There may be cases -- you know, as I say the scope of this is business operations, investment, asset management, asset health, asset condition. If questions are posed that are sort of outside of that scope, or if there is any matters that we think ought to be just simply asked in terms of an Information Request, at that point in time Ms. Ramage or I may take the microphone and may provide some -- some comment with respect to that. So just wanted to let you know that might -- might occur.

So I think that that's really what I wanted to say in terms of opening the session. I'm going to flip it over to Ms. Ramage now for a few remarks, and then we'll have Mr. Wortley start his presentation.

OPENING COMMENTS BOARD COUNSEL:

MS. PATTI RAMAGE: Thank you, Greg. From the lawyer's perspective, this process is a technical conference. It is going to be transcribed today. The evidence, however, is not sworn. There was a concern raised whether parties could rely on this -- the materials that are provided today, and the information provided in the GRA.

I -- I believe that what will ultimately happen is the transcript from this process will be made an exhibit in the hearing. Manitoba Hydro will advise if any corrections or clarifications are required to that exhibit. And you will be able to rely on the transcript of -- of this process, subject to any corrections or clarifications. And Information Requests to confirm any materials dealt with today will not be required.

So that end, we -- we hope that this will assist in reducing some of those very

introductory Information Requests. Although, as Greg said, from our perspective the real goal here is to make sure that all parties are working from the same page, understand the terminology, understand Manitoba Hydro's processes, so as not to have Information Requests that are based on inaccurate foundations. And that way we believe the Information Request process will be streamlined.

So we certainly support the PUB's efforts in trying to develop new -- new strategies to deal with the discovery process, and to try to improve that discovery process. So we certainly hope that this will be a successful day. Thank you.

THE FACILITATOR: Mr. Wortley...?

DR. BYRON WILLIAMS: If I could inter -- just interrupt for one (1) second. It's Byron Williams on behalf of the Consumers' Coalition. Just because -- and you probably intended to do this anyways but just because we're unfamiliar with Mr. Wortley, it would be great to hear who he is, and how long he's been at Hydro and that.

I think that would be just a nice -- again it's up to Hydro, but that would be helpful to us.

MS. PATTI RAMAGE: Certainly. I --

I'm certain that Joel can -- can take care of that, and give you some of his background at the outset of his presentation.

PRESENTATION BY MANITOBA HYDRO AND QUESTIONS:

MR. JOEL WORTLEY: Good morning, everybody, and -- and welcome. I'm pleased to be here to talk to you this morning about some of the things we do at Hydro, and -- and to begin with I'll introduce myself, as -- as requested.

So my background is I'm an engineer by training. I'm -- graduated from the University of Manitoba in 1994 out of civil engineering. I spent some time in consulting. Went back and did a masters degree in geotechnical engineering and joined Manitoba Hydro in 2002, so about fifteen (15) years ago now, first off, working in -- in generation, particularly dam safety, and then moving over to transmission and -- and design, and then back to generation, leading in the Engineering Services Group, and then more recently moving into the central role as director of strategic business integration.

So if there's no particular questions about my background, I'll jump right in from there and begin with a bit of a exploration of the -- of the

purpose of what we're here today for and a bit of a disclaimer. And so what I want to try to do today is introduce a common understanding of our -- of our business and capital practices and, as much as possible, foster a common language.

And that's one (1) of the challenges when it comes to asset management. The language is often used interchangeably and in a confusing fashion, where people say the same words but they mean different things. So part of today's objective is to try to bring some consistency to how we use the words.

It's meant to be an informal session today, interactive. I'd like to learn as much about what you're interested in as I'm hoping you'll learn from us as to what we're doing, and so that we can do a better job of answering your IRs by understanding better what -- what you're looking for. And so feel free to -- to ask questions. And -- and please answer our questions when we look for clarification as to what you're looking for.

And the disclaimer is that everything you're going to see here today is a bit of a work in process. And -- and that just reflects that everything is a journey. We're always on a journey with no beginning and no end. Things are always

evolving and changing, and they change at different rates in different places in a big organization like Manitoba Hydro. So there's -- there's no absolutes to what I'm going to show you here today, but they -- they're all things that -- that are happening and -- and that we're working on.

So we're going to talk about this morning Manitoba Hydro's operations and assets. We're going to explore asset management a little bit, get into some detail about our business operations, capital planning processes, and end on how we forecast asset replacement.

These are some of the terms that are going to come up today and -- for consideration, and maybe we can discuss this a little bit as we go, the possibility that maybe we need a glossary. Maybe we need a glossary of terms with common definitions that we can -- we can refer to. And if it -- if it looks like that that would be helpful, maybe that's something that we can look for input as to what -- what terms are we struggling with, and we -- we can look at building that out.

Beginning with operations and assets, we all, I think, understand that Manitoba Hydro operates as a supply chain. We need to generate

electricity, which is done in our generating stations. It gets stepped up to a high voltage and transmitted over long distances in the transmission system, stepped down progressively through different stations, to the distribution system, and eventually fed to customers through that pole line in your backyard or the green box in -- in your front yard. And these stations are the switch yards in which the transformer -- transformation of voltage occurs.

When you look at generation, you've got a relatively small number of high-cost assets. Those generating units are expensive, but there's not that many of them. When you look at distribution, there's a very high number of low-cost assets. There's poles all over the place. There's -- there's cables. There's -- you can't find a corner of the province that doesn't have a distribution asset in it.

And transmission sits somewhere in-between in that they've also got some complex and long linear assets that span the Province, as well as a lot of repeated assets, and further complicated by the DC link, which is Bipole I currently and Bipole III coming.

This system, this supply chain, has to work twenty-four (24) seven (7), three sixty five

(365). It's not -- not a nice-to-have. It's a must-have. And so the -- the design, the operation, and the sustainment of the system is targeted at operating in -- in all kinds of weather, all kinds of situations, and surviving all kinds of disruptions.

The operational objectives of these systems, first on the distribution system, is to deliver that energy to the existing customer base, but also to connect new customers. And that's what drives their day-to-day activities.

In a transmission system, it's about regional energy delivery, getting enough energy into a certain corner of the Province, and assuring the reliability of the overall electrical system. Within the generating system, it's about supplying Manitoba load first, that's the minimum, and then generating revenue from any surplus energy.

So when we look at this supply chain in a little bit more detail, we see that it all drives out of the customer, what the customer does, how much energy they use, aggregates -- or is -- is the basis for -- for what we need to provide. And it aggregates depending on -- on local geography, local density, into a -- into a local demand which might be towns. It might be more dense in a city.

That local demand aggregates into a regional demand -- How many cities are in this corner of the province -- which aggregates, then, into a total provincial demand: How much energy is needed to serve the entire province?

That total supply is made up of a collection of hydraulic and thermal resources at Manitoba Hydro, and wind, I guess I should say. And generating stations and those hydro -- hydraulic and thermal resources and delivering generating stations which are populated by generating units, all of which is connected by a transmission system.

And so the point here is there is a very long chain between what an individual customer needs and what you need out of a generating unit. They don't -- it's not a one-to-one relationship, and it's a network system that -- that connects the two (2) such that there's multiple potential ways in which that -- the -- the watts pushed out of that -- that unit arrive at a particular customer. It's very complicated. And of course, anything that's not used provincially gets exported for revenue.

When you're looking at that -- that generating unit, it -- it's not as simple as saying, It produces energy and energy gets consumed by a

customer. It does other things. So certainly, it has to supply load, and whatever -- and produce revenue. That's -- that's its function. But it also has a function in the stability of the grid. There has to be a load-balancing function. And so when you're looking at different units, they have a different role to play or have different strengths.

And that's -- so for instance a large unit may be very good at supplying load, but may do nothing for you in terms of stability and load balancing, whereas you have a -- a smaller unit that's very good at fluctuating up and down, and is helpful in terms of load balancing. When the load goes up, the unit produces more energy. And so it -- it has something more to offer than that big unit that is really only good at operating at one (1) level.

A particular unit may have a role to play in system flow, in supporting operations. So where you put the energy on the grid matters. And so its -- its location is of consideration when you're considering what that unit does for you.

You can have a different role to play in reliability. So, for instance, during a drought, a thermal unit becomes all of a sudden much more -- much -- of much more value to the system because you don't

have the water to run that big hydraulic unit. That's -- and a -- a good water year supplies all kinds of -- of electricity.

And lastly, different units have a different role to play in black start. And so black start is the restarting of the system after a province-wide blackout. So something has gone terribly wrong, the system has come offline, the whole province is dark, and you need to get it back online.

And that's a very complicated, difficult process that -- that builds up re-energizing pieces one (1) at a time. And it's got to start somewhere, and that -- that black start, not all units are capable of doing that. So that's another value or another service that that unit may offer to the system.

And so when you -- when you look at this supply chain, you have to consider the operating context of that particular unit. It may provide all of those functions, it may only provide value in one (1) of those functions, and that -- that value that it brings will dictate how you manage that asset and how much money you're willing to put into supporting it.

And so it's -- it's a complicated relationship or a complicated assessment in terms of

what -- what value that unit brings, which is just one (1) example, and in this case, a generating example, of how complicated this system is.

You could draw the same example within the transmission system -- and the -- and the -- it's the network system and it has -- has depth, and the -- the distribution system. So it -- the -- the point here is that it's -- it's a very complicated supply chain with many layers to it, and -- and it's highly specialized in different areas.

So it's -- it's very hard to draw generalities across the whole thing. It -- it's very situational and specific to the operating context at the particular piece of the system you're looking at, which makes it complicated.

However, it gets worse. When you look at that generating unit, it doesn't sit alone. You have to look at its particular operating context and what's going around -- around it. So a generating unit -- and I think I can do this. Let's try it. No. Oh, maybe -- sorry. I'm trying to use the mouse to point; not going to work. Okay.

So in the middle of this picture is the generating unit, and this is a cut-away of one (1) of our -- our generating stations. So the water flows

from the forebay on the left to the tailrace on the right, and flows over the turbine in the middle of the picture, which spins the rotor inside the stator and pushes electricity out of the building.

And so that -- that is -- when we talk about the generating unit, that's the -- the part that we're -- we're referring to. It, of course, can't run alone. It is supported by a bunch of auxiliary systems, and these are the oil and water systems, and the fire systems, and the cranes and the hoists, and all the things in that generating station that are required to keep that unit online.

It sits inside a structure. In this case, it's the -- the powerhouse, or the main -- or the -- the concrete dam which holds back the water. But then there's also beyond that, infrastructure. And so if we looked at that in an example, and this is in the Kelsey Generating Station up in northern Manitoba, you'd see that we've got the powerhouse on the left, which is the building with all the switch gear on it that looks like it's growing hair.

Around the rim as you go deeper into the picture are the dams and dikes that hold back the water. The spillway is a little bit in the distance there with the superstructure sticking up out of the

water. Beyond that out into the forest is another dike line that's holding back the forebay.

In the near ground you've electrical infrastructure, including a switch yard on the far right, transmission towers and lines, local distribution that feeds the -- the buildings and the infrastructure on site. You've got staff house. You've got camps, shops, storage buildings. You've got municipal infrastructure in terms of drainage water treatment, wastewater treatment, solid waste management.

You've got communications infrastructure. There's a communication tower right in the middle -- to the -- to the right and middle of the shot, and fibre optics, and you've got transportation infrastructure, roads throughout the site. And way in the back there, hard to see in the -- - in the trees, an airport, because this is a remote site and you need an airport to support your operations.

So we've got a -- a tremendous debt of layering of -- of assets here that are all required to service that customer. And so when you look at, for instance, how important is this one (1) chunk of infrastructure to me? There are many steps and many

layers to, What do I need it to do to get energy into that customer's hands. And so it's not a direct or easy correlation in terms of tying the two together.

It gets worse when you look at it regionally. And so this is the map of the system with the generating units as -- as blue dots. The transmission system shown as -- as lines, and you can see that it's quite regional. The supply is largely northern, and particularly on the Lower Nelson River are the big generating stations. The load is largely southern, so you've got a transmission challenge in terms of getting the electricity to where you need it.

It is a province wide delivery. There's customers throughout, as you can see, with highly varying density. There are places where customers are very few and far between and there's places more like Winnipeg where there's -- where it's very dense. And, of course, very remote assets of all kinds.

There are places that are very hard to get to and obviously we have some extreme conditions in Manitoba that make servicing these assets very challenging. When we look at our current situation within the province we see that we've got a -- an adequate supply, but our -- have some challenges with

regional capacity.

So there have been some hotspots of growth over the last little while in the province and they're shown here in this diagram, particularly in Winnipeg and -- and surrounding areas, but also up the east side of Lake Winnipeg and out to the west where local load growth has resulted in a capacity issue for the transmission and distribution systems.

So some expansion is required to deal with those growing areas of -- of low growth. And in terms of investment what that translates into is on the distribution system we've got capacity expansion that needs to be dealt with, but we've also got some deteriorating asset concerns.

Much of the distribution system is -- is degrading to the point where it's going to need investment. And given that these are -- sorry, I should say, is going to need more investment. And -- and these are these large volume relatively small assets that you need to manage as -- as a fleet or a population. It's not about that asset needs replacing today.

It's about, I have a large quantity of these assets. They're all degrading and if I don't replace them -- if I don't renew them on a -- on a

frequent enough cycle they're going to start -- I'm not going to be able to keep up. We'd be overwhelmed by the demand for -- for renewal and -- and the system is going to start to fail.

DR. BYRON WILLIAMS: Can I ask you just to go back to slide 15 just for one (1) second, please? Could you just in terms of those -- the -- the hotspots in terms of -- of growth, could you just tell us a little bit about -- about them?

Just -- so let -- let's start at -- to the east of Lake Winnipeg and just kind of what's driving growth?

MR. JOEL WORTLEY: I -- I don't have a lot to -- to share on that respect. I don't know if we can --

DR. BYRON WILLIAMS: That's -- that's fine. We'll -- we'll explore it. There are the fla - - five (5) flagged hotspots of regional grown that -- that Hydro has identified?

MR. JOEL WORTLEY: These are the areas where -- where we're needed -- we're having capacity issues due to regional growth, regional low growth.

DR. BYRON WILLIAMS: Okay. We may come back to that, thanks.

MR. ROGER CATHCART: Just a follow-up

question, does that -- how did you identify those areas as -- as capacity constraint? Was it just because of out -- outages or -- and in particular, the east side of the -- of lake.

MR. JOEL WORTLEY: So the --

MR. ROGER CATHCART: It's not highway dense population.

MR. JOEL WORTLEY: The -- the system is operated in real time. And so the -- the load and the supply is -- is constantly monitored, and the -- the capacity of the equipment to -- to deliver that supply is being monitored.

And these are the areas where we're -- we're seeing capacit -- or transformer banks being overloaded, and -- and having concerns about if -- if we lose one of those elements we're not going to be able to meet the local load.

DR. BYRON WILLIAMS: And -- and could you just -- so we have the regions in pink, and then to the -- on the west side of the Province, and that can't be my hometown, Souris, there. It don't look like it.

But we see the pink, and then the yellow. What does the -- what does the pink and the yellow there represent, and where is that?

MR. JOEL WORTLEY: The -- the pink is -- is areas of higher concern. The yellow is slightly lessor concern, or lessor capacity issues. And in that area, I believe it's been -- is reflective of -- of oil and -- oil exploration in the area. Oil and gas.

DR. BYRON WILLIAMS: Are you able to comment on any of the other regions just to the west or to the south of Winnipeg? Just what's going on there.

MR. JOEL WORTLEY: Only to say that it -- general -- residential and commercial expansion. Beyond that I -- I couldn't give anything specific.

DR. BYRON WILLIAMS: Okay. Thank you.

MR. ALEXANDER BUKALEV: Alex, from METSCO.

So just wondering whether this -- how -- how detailed is this forecast, for the next five (5) years, ten (10) years, fifteen (15) years, twenty (20) years? So this load growth capacity issues that you're saying.

MR. JOEL WORTLEY: I couldn't tell you that off the top of my head, but that -- that would be a question that we could certainly answer in an Information Request.

MR. ROGER CATHCART: Just a follow-up question. The City of Winnipeg, is that just the southwest quadrant, or is that the whole city?

MR. JOEL WORTLEY: That's primarily the -- the core but the city has hot spots, as well.

MR. ROGER CATHCART: So that's Winnipeg Hydro?

MR. JOEL WORTLEY: The old Winnipeg Hydro system is a particular concern, yes.

MR. ROGER CATHCART: Okay.

DR. BYRON WILLIAMS: And -- and this may be beyond your knowledge but we're just trying to figure out -- so there's the capital asset management thinking. There's also the load forecast thinking.

And we're trying to get out heads about how those -- this is -- how those relate, and -- and the -- is this information produced by the load forecast people? Is it fed back to the load forecast people? How -- if you're able to comment, how -- how does that relationship work?

(BRIEF PAUSE)

MR. JOEL WORTLEY: So the -- the capacity issues we're having are -- are ones that

exist today, and are ones that need to be resolved in the next ten (10) full years. So the next zero to five (5) years kind of thing. So this is not the long-term outlook. This is things that are in the immediate future.

Does that help?

MR. ALEXANDER BUKALEV: Just a follow-up question. For how long has it been existed, those capacity issues?

MR. JOEL WORTLEY: How long have we had the capacity issues?

MR. ALEXANDER BUKALEV: Yeah.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So the -- these things are -- develop over time, of course, and so -- and -- and there's a -- there -- there's a -- sort of a lagging -- you know, the -- the problem develops. It -- it's identified. There's a planning process. What are we going to do about it. Then there's a -- some time to actually effectuate the -- the solution.

And so a particular problem -- the -- the time between a particular problem is identified into when it's resolved will vary tremendously,

depending on where it is and what -- what's happening.

These particular ones, a typical horizon might be something like the -- the problem -- and -- and -- sorry. The short answer is, It's complicated -- doesn't help, because the -- the problems have a various -- varying severity, as well.

So when it's first identified as this could be a problem, when you actually action will depend on how quickly it's developing and -- and so how urgent it is. And so these particular problems, some of them have been around longer than others, but in -- for the most part, capacity issues are -- are resolved as -- as required to keep the system whole and -- and manage risks. So there's no real rules to it, and it develops slowly over time.

So I'm -- I'm struggling to just give you an exact time frame as to when these things were identified, because it's not like an on/off switch. It doesn't just happen one day that you've got a problem. It grew over time.

MR. ALEXANDER BUKALEV: And I -- I guess that there is specific forecasts for each of this area for the next little while, up to twenty (20) year horizon, let's say, that would show how it's been -- will be progressed over time?

MR. JOEL WORTLEY: The -- there obviously is a domestic load forecast. I'm not familiar enough with the details of it to tell you exactly what's in it for these given areas.

DR. BYRON WILLIAMS: My friend, Me. Hacault, may have another question, but, again, this will be a -- a very basic question. Are these -- these hot spots, these are -- would -- would I be fair in suggesting they're transmission hot spots?

MR. JOEL WORTLEY: There are transmission and distribution issues in these areas, and that the -- the transmission serves the aggregate of the distribution load. So if you've got a transmission issue, you've probably got a distribution issue.

DR. BYRON WILLIAMS: Fair enough. Thank you.

THE FACILITATOR: If I could just -- sorry, Mr. Hacault, if I could just maybe help clarify. Our load forecast is produced statistically on -- on a Province-wide basis. We don't do a bottom-up approach to the load forecast by looking at geographic loading. It -- it's a statistical analysis based on -- based on the inputs from economic outlook, customer growth, that type of thing, on aggregate.

So we have a number of different planning processes within the organization which meet different needs of the organization. And so the transmission folks will be doing planning studies on a routine basis in terms of loading on the transmission system. That would happen separately and independently from what we would do in our load forecast activities.

And the load forecast activities are more in terms of an aggregate level of consumption in the Province, aggregate expected growth obviously in terms of peak and energy both, but they would be two (2) different -- separately different processes that are conducted and may not necessarily be, for -- for all intents and purposes, tied together, because they -- they're serving different needs. So that -- that's kind of the approach we would probably take.

MR. ROGER CATHCART: Yeah, one (1) quick follow-up question. You've got seven (7) problem areas. Have -- have you figured out or put it -- put them into budget buckets how much needs to be spent in each of these regions or time -- time-lapsed budget buckets?

MR. JOEL WORTLEY: There are -- there are projects identified and included in the capital

expenditure forecast to deal with these.

MR. ROGER CATHCART: Are -- are each of them equally as bad, or is there -- are -- they're -- they're all --

MR. JOEL WORTLEY: I guess it depends on how you define 'bad'.

MR. ROGER CATHCART: Well, the -- the -- prioriti -- prioritizing.

MR. JOEL WORTLEY: The ones in -- in the core and -- and the downtown are -- are probably a higher priority, and -- and that there's more people affected and -- and they're more challenging. But certainly the -- the -- there would be -- there is a prioritization behind the decision as to when to do which.

MR. ROGER CATHCART: So can I understand this, that if the -- if everything is white, there's -- there's very little problems in the area? These are just the high -- the red areas and the yellow are -- are basically where the real concerns are, but you're still doing maintenance work and everywhere else?

MR. JOEL WORTLEY: Thi -- this is simply a capacity view.

MR. ROGER CATHCART: Capacity.

MR. JOEL WORTLEY: So this is areas where we're not having enough capacity to meet load.

MR. ROGER CATHCART: Okay.

MR. JOEL WORTLEY: The -- the health or the -- the degradation of the assets is unrelated. That would be a different view.

MR. ROGER CATHCART: Thank you.

MR. ANTOINE HACAULT: My question was just to better understand what kind of reports get produced with respect to these hot spots, and which department or who produces those reports. And I think I had a partial answer from you, Mr. Barnlund.

I don't know if you can break it down into those two (2) sectors, Mr. Wortley, just like what kind of reports get produced with respect to those hot spots, and which departments produce those reports.

MR. JOEL WORTLEY: So system planning would have the primary responsibility here for looking at the -- the transmission grid and making -- making an assessment as to what -- what needs to be augmented.

And so there'll be system planning studies on -- on not only -- there'll be system planning studies in each of these areas. They -- they

might -- might be numerous studies to aggregate into one (1) region depending on the -- on the challenge.

And then within -- within that, there's also a distribution planning exercise where, as -- as customers are connected and -- and as load grows, the -- the capacity of stations is -- is reviewed and decisions are made as to how to -- to how to meet that growing load.

MR. PATRICK BOWMAN: It's Patrick Bowman. I was -- just wanted to follow up on something we had heard earlier in some other meetings about -- in many cases, or in -- in a few cases at least, there can be large customers who have contracted demands that exceed what they are actually using.

And that contract demand can cause certain planning issues for Manitoba Hydro because the contract demand is -- it needs to be -- it needs to be planned for whether the customer is actually drawing that demand or not.

When we're looking at something like this, is this based on actual flows, or -- or is the issue of there may be somebody sitting on certain amounts of -- of contracted demand in these areas?

MR. JOEL WORTLEY: So these areas of

capacity would -- would be related to actual flows. When you're connecting large -- large customers, the issue is -- is dealt with as its -- as its own issue. So it's -- it's a study done to see, How are we going to connect this customer? And -- and a -- and a solution is devised to meet that contracted need.

MR. PATRICK BOWMAN: Right. But you -- you might not -- you wouldn't have a red bubble on the map if -- for example, you might have a substation heading towards an issue if you add up the contracted demands. But it doesn't actually have an issue based on what's actually being used because the usage is far below the contracted level. That wouldn't lead to a bubble on this type of graph?

(BRIEF PAUSE)

MS. PATTI RAMAGE: I think, Patrick, this is going beyond what Mr. Wortley's area of responsibility is. I think that one would -- that question would probably be best put in an IR to -- so that the -- I think that would go over to the transmission or distribution people to understand how they deal with contracted demand in -- in their studies.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So looking at the current status of the system as it relates to investment requirements, on the distribution system, we have some capacity issues that require some expansion.

We also have some deteriorating assets, and these again are these high-volume, relatively small-asset fleet or -- or populations to which some renewal is required to keep the asset population as a whole healthy.

And if -- if you don't keep up, it turns into an overwhelming liability. And that's why there -- the distribution system is our area with the highest need for renewal investment currently.

In the transmission system, there are some capacity issues to deal with this regional load growth. But overall, the -- the forecast is a -- for an acceptable level of performance at -- at current investment levels. So things are -- are looking acceptable there.

And in -- in generation, on the generation system, there's sufficient capacity to serve the load growth that we're seeing, and again, an

acceptable level of -- or acceptable performance at current investment levels with one (1) little caveat, which is that there are a number of large assets, both in the transmission and generating system, that are approaching middle age.

And we don't foresee a -- a problem there at this time, but some more study needs to be made on things like the large lower Nelson River generating stations that are approaching middle age to see how much investment is going to be required to keep those -- those assets healthy, because they make up a significant portion of our generating capacity.

So that hopefully gives you a bit of understanding of -- of the -- the breadth and depth of the system and -- and how varied it is, and how complicated the context is. So -- so when you try to manage these assets, it comes with many, many different challenges.

I want to talk a little bit about what is asset management, and -- and do that with a bit of an example around different asset management strategies. So you can have proactive and reactive asset management strategies.

So a -- a proactive strategy is to replace something before it fails, and a reactive

strategy to wait till it fails and then replace it. In the proactive case, you are trying to avoid a significant in failure -- in service failure consequence. You don't want it to happen in -- in service because it's going to be a big problem for you. Whereas if you're willing to run it to failure that means that the in service failure consequence is manageable. You're willing to let it happen.

In the proactive case, you're going to manage the degradation of the asset, and make a judgment call as to when it's time to replace it as in when you find that the risk of keeping it in service is no longer tolerable. And with the reactive, you might have an idea of how long it -- the asset is going to live but until it fails you're not doing much about it.

With the proactive case, you may choose to defer or advance that replacement to smooth demand. And so you may choose to not have overlapping projects in a given year by -- by deferring or advancing one (1). And in the reactive case, you -- you may advance the replacement but you've got no real ability to defer it because once it's failed, it's failed.

So in your life, an example of a proactive replacement might be your -- your furnace

where you might say: It's unacceptable for me to be caught in a cold, dark January night with no heat in my house so I'm going to get it inspected every once in a while. Have it maintained, and based on what the technician tells me at some point I'm going to say, okay. The risk is such that I'm going to do -- I'm going to replace it this year even though it's still working.

Or it might be the roof where you're watching the shingles curl, and you're saying: Well, I think I can get one (1) more year out of it but if that big storm happens and I lose a bunch of shingles and a bunch of water damage occurs, that collateral damage is too a risk for me. So I'm going to replace that roof before it, in fact, has failed.

In the reactive case you might say your hot water tank, I can live for a couple days without hot water so I'm just going to let that thing fail and not do any -- any proactive replacement. I might put a catch basin under it with a hose to my drain so that it -- when it does fail I limit the collateral damage, but I'm not going to do more than that.

Another example might be the sealed -- sealed unit windows in your home where over time those seals eventually fail, and the window fogs. Well, you

might say, I see them all starting to fog and so I know they're all going to need replacement eventually. I might pace that over a number of years. Rather than wait for them to fail all at the same time, I might do them a few at a time to -- to smooth that expense.

So in that sense, managing those assets looks a little bit like this. You've got a system of some kind. It's made up of a bunch of sub-systems which are made up of a bunch of components. So an example might be, you might have components like pumps and pipes that make up a fire water system that's part of a fire suppression system in a -- in a generating station. So it's -- it's layer upon layer.

And that -- that bottom layer is the layer you actually manage. That's where you program the maintenance. That's where you consider the life cycle. That's where you consider the longevity.

(BRIEF PAUSE)

MR. JOEL WORTLEY: Okay. I'll try to speak more directly into the microphone.

(BRIEF PAUSE)

MR. JOEL WORTLEY: A little bit slower. I'll try. So this -- this base level of asset is -- is where we actually make asset decisions. It's where you decide how much maintenance to do, what -- what strategy to adopt, be it run to failure or -- or proactive replacement.

And so we can say that that -- that is where assets get managed. But when -- when you talk about asset management it's actually much, much broader than that. Asset management is the coordinated activity of an organization to realize value from its assets. Let me say that one (1) more time because it's really important.

Asset management is the coordinated activity of an organization to realize value from its assets. The coordinated activity of an organization. That's very, very broad. And so it's more -- more of a look like this, in that when you look at the overall business objectives of Manitoba Hydro, it's about creating customer value which comes from delivering energy and delivering services.

That energy and that services comes from our systems operations and customer service areas relying on the generating system, the transmission system, and the distribution system. So in this

sense, asset management is a top down endeavour.

And so we -- we at Manitoba Hydro are working on a corporate asset management initiative to do exactly this; to coordinate activities to realize value from assets in accomplishing our business objectives. This corporate asset management is -- is --

DR. BYRON WILLIAMS: Can we stop you here? I think we both have some questions on this slide -- no, the next -- the next slide?

MR. JOEL WORTLEY: Sure.

MR. BYRON WILLIAMS: Oh, Alex has one (1) on this slide. I'm ready for the next one (1).

MR. JOEL WORTLEY: Okay.

MR. ALEXANDER BUKALEV: So the question is: Do you have this objectives identified for each of the bigger triangles, and small triangles on the left and on the right?

MR. JOEL WORTLEY: So if I understand your question correctly, you're asking whether we've -- we've fleshed out our -- our asset management objectives for the -- for the various layers of the organization?

MR. ALEXANDER BUKALEV: Correct.

MR. JOEL WORTLEY: And so the -- can

we come back to that? I think I'll get -- I'll -- I think I'll answer your question as we get into the -- into the -- the next slide a little bit.

DR. BYRON WILLIAMS: Okay. Because we know that the Corporation has completed a corporate value framework.

MR. JOEL WORTLEY: Yes.

DR. BYRON WILLIAMS: And that is something we're certainly quite interested in -- in getting. And -- and the sooner we get it, the -- the better, from -- from our perspective.

(BRIEF PAUSE)

MR. JOEL WORTLEY: Sorry, you're -- you're asking about the corporate value framework or about the asset management framework?

DR. BYRON WILLIAMS: I'll come back to that. It's -- I was asking that the Corporation's completed a project to create a corporate value framework, allowing it to prioritize projects across all lines of business. That's what I'm referring to.

MR. JOEL WORTLEY: Yeah. So the -- the details behind the corporate value framework have been filed within the --

DR. BYRON WILLIAMS: Alex knows that, I don't, sir.

MR. ALEXANDER BUKALEV: I just don't see these objectives on the other slide, so I was trying to understand whether you have targets and measures specific to each of the triangle. So let's say on the business objectives you have reliability targets on say corporate debt, and that will go down to generation transmission distribution. And then distribution you have specific targets that will go down to system assets, subsystems, and components?

MR. JOEL WORTLEY: So the short answer is -- is not yet, and I'll get into a little bit of that in the next slide.

MR. ALEXANDER BUKALEV: Not yet, meaning not, or partially you have something?

MR. JOEL WORTLEY: So we -- we don't have the alignment that we'd like behind those -- those metrics and objectives. That's the -- the purpose of -- of building a corporate asset management framework is to -- is to bring that alignment such that the -- the -- all the pieces roll up and fit together.

As it exists today, different areas have -- have objectives and -- and metrics they're --

they're using. But the purpose -- or the point of having a corporate asset management framework is to -- is to in -- integrate it all and align it. And that's the part that we're working on.

MR. ALEXANDER BUKALEV: And what -- what's the plan? Or that's the next slide, basically?

MR. JOEL WORTLEY: So the -- the plan -- the journey begins with the -- first of all, some centralization.

DR. BYRON WILLIAMS: And I have a definitional question on this slide. So if we think of the UMS study, and, you know, at a high level it described the -- the current asset management system is highly fragmented and siloed, and then they talk about, in terms of best practice, three (3) potential options being decentralized, hybrid, and centralized.

So are you using centralization here in the same way that UMS...?

MR. JOEL WORTLEY: No. We are using centralization here as -- as a generic term with reference to the UMS report we would be following more the hybrid model.

DR. BYRON WILLIAMS: Okay. And so, Greg, that's something in terms of definitions and terms, like, because that is a core philosophical

issue arising from UMS. And -- and I'm not -- and I'm not criticizing the use of the term here. This is quite helpful.

And it looked to me like a hybrid, but I think that might be something that we should keep in mind going forward, if that helps any.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So in the -- in the early stages of this asset management journey under the -- this corporate asset management initiative we've begun the centralization and we've started the work around creating this -- this framework for -- for business alignment.

We've also got a lot of work underway for improving our -- our capital tools and processes, particularly in the asset investment planning capital portfolio management and the asset condition assessment, all of which I'll give you some more information on as -- as we work in here.

With respect to the corporate asset management governance structure, we've created a corporate asset management executive counsel. And so this is a vice-president level committee chaired by

the company's chief finance and strategy officer.

It provides that centralized vision and strategic direction for asset management within the company and acts as the asset owner. This is the group that essentially owns the -- the objectives, the funding, and the risk tolerance that will be the guiding principles for the asset management activities.

Under them we've got the corporate Asset Management Steering Committee, which is a delector -- director level committee chaired by the Director of Strategic Business Integration, which is me.

And that's a new position created in the last -- last number of months here and is the beginning of that -- of that centralization in bringing a -- a central ownership to the -- to the processes and tools that we're going to use for asset management.

And so the role of the CAM -- Corporate Asset Management Steering Committee is to execute asset -- Manitoba Hydro's asset management and development strategy and act as the business owner for -- for processes and tools to ensure consistency.

MR. ALEXANDER BUKALEV: Do you

currently have vision policies strategy that they mention here? You don't mention policy, but there is a vision, there is risk management strategy.

MR. JOEL WORTLEY: I need one (1) more clip to tell you that. Here it comes, so within this corporate ass -- in this -- within this corporate asset management initiative is a -- is a plan to develop a framework. And so this would be a corporate framework as to how we want to do asset management in Manitoba Hydro.

In Phase 1, as -- as mentioned already, was to review where we're at with respect to industry best practices, things like PAS 55, ISO 55000, a GAAP assessment. And this is -- this is recently completed and it's been filed within the general rate application.

Phase 2 of this endeavour is to come up with asset management strategy and -- and policy documents. And this is in progress. We're just getting started on this and this -- and this will be the top level asset management strategy and policy, which will begin the cascade down through the organization.

And so when I say in -- in response to your question of, Do we have objectives and metrics

for all groups, and -- and then my response would be that they're not currently aligned through an asset management framework. This is the framework that will bring that alignment, of which the first -- or the next step is developing that top level strategy and policies, which everything else will fit under.

DR. BYRON WILLIAMS: Just on -- on -- in terms of that, just going from UMS at Appendix 5.1 on page 24, there's a reference to some of the business units having developed already asset management road maps and strategies.

I'm not as familiar with the record as the -- the team from METSCO, but are those on the record as of yet?

MR. JOEL WORTLEY: So I think what UMS was referring to there is that there are -- there are a number of strategies and processes and tools and methods that have been developed for managing assets.

But in terms of asset management strategies and -- and policies, they haven't been rolled together to give the fulsome view. And so there may be pieces that have been filed in -- for different reasons, but not as an asset management compendium.

DR. BYRON WILLIAMS: So one (1) of the

problems we have -- and I understand your narrative about the journey that you'll be on on the next three to five years, but we're focussed on a -- a test year and the -- two test years, and we're trying to understand how it works now.

And so to the degree we can get insight into the -- the pieces that would be helpful and -- and certainly, I presume to the ex -- when -- to -- the business units that have developed these asset management world maps and strategies as they currently exist, I -- you -- I'm -- we're hoping that we can get those from Manitoba Hydro.

(BRIEF PAUSE)

DR. BYRON WILLIAMS: We're not aware of those being filed and those are certainly, we think, relevant to the current GRA.

MR. JOEL WORTLEY: So again, I think we're -- we're suffering from a bit of a -- a vocabulary or definition issue in that you -- when we say asset management strategy --

DR. BYRON WILLIAMS: I'm using the words of UMS, page 24, Asset Management Roadmaps and Strategies for Different Business Units.

MR. JOEL WORTLEY: And -- and so many different things could fit under that heading. And so if you've got specific things that you'd like to see, certainly ask for them and we'll -- we'll produce them. But a request such as, Please show us all your -- all your asset management documents is very difficult for us to fulfill.

(BRIEF PAUSE)

DR. BYRON WILLIAMS: Do you understand -- what do you understand UMS to be saying by, business units devi -- have already developed asset management roadmaps and strategies?

MR. JOEL WORTLEY: I -- I can't speak directly for UMS.

(BRIEF PAUSE)

MR. JOEL WORTLEY: Phase 3 of this endeavour --

MR. ALEXANDER BUKALEV: Just -- just -- sorry, Joel. Just another question on the previous slide, corporate asset management governance structure. So the -- the GRA that was filed, did it -

- the spending on asset management, did it go through executive council approval and steering committee approvals?

Or that's the new process that you will be using in the future, but the program that was suggested in the -- in the filing did not get approval of CAM executive council, it didn't get approval of CAM steering committee?

MR. JOEL WORTLEY: Sorry. I didn't quite understand. Which part were you looking to be reviewed and approved?

MR. ALEXANDER BUKALEV: The -- the capital spending --

MR. JOEL WORTLEY: Capital spending. Okay.

MR. ALEXANDER BUKALEV: -- and I guess any asset management expenditures which are capital spending, and maintenance.

MR. JOEL WORTLEY: So under the -- under the current policy, these groups are -- are -- have very limited approval authority, and so the -- for particular expenditures or -- or plans.

And so as it -- as it currently stands, the projects in excess or between $15 and $25 million are approved by the corporate asset management

executive counsel, and the -- the corporate capital expenditure forecast is not reviewed by this group directly. It's reviewed by the executive committee, which is the larger body of all VPs and so it's -- it's larger than the executive council here.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So maybe just to add a little bit more to that; to say that the -- the approval auth -- author -- auth -- authority of these committees is limited, as I -- as I said. Also, they're newly formed such that the expenditure forecast that has been filed would not have been reviewed by these people or by these committees, if that directly answers your question.

So phase 3 of the corporate asset management initiative is to -- is the implementation to which a roadmap will be created following phase 2.

DR. BYRON WILLIAMS: Do you have a general time frame for that? Like if we think of UMS, they -- they talk about kind of moving from novice to competent taking three (3) to five (5) years. Is -- is that kind of the framework that the -- the Corporation --

MR. JOEL WORTLEY: I think that -- that's certainly what we'd like to do. Until we get into it and understand the challenges, it's very hard to say how long it might take.

DR. BYRON WILLIAMS: And has UMS been retained for any further work?

MR. JOEL WORTLEY: We're -- we are currently in discussions with them regarding phase 2.

DR. BYRON WILLIAMS: Okay. And they -- they talk about in their report, in the eight (8) or nine (9) or ten (10) -- perhaps ten (10) other organizations they've worked with on this journey, results kind of the 20 to 30 percent savings over -- over that journey.

Have -- has Hydro developed any high-level estimates of potential related to efficiencies, if any, that might flow from this?

MR. JOEL WORTLEY: No. Until we understand the scope of what we're trying to accomplish, it's very hard to estimate what the impacts may be.

MR. ALEXANDER BUKALEV: And related to this question in general, there was a decision to go with an asset management journey. Was there a business case developed before that to understand what

kind of efficiencies at the end of this journey would be accomplished or achieved by Manitoba Hydro?

MR. JOEL WORTLEY: The -- the decision to -- to embark on the asset management journey was not evaluated in a simple business case analysis, and it wasn't -- it wasn't an either/or with a simple inputs and outputs type decision. It was more of a -- we need to mature and evolve our practices and get better at what we do, and here's -- here's the method to doing that.

(BRIEF PAUSE)

THE FACILITATOR: So maybe I'll kind of canvass the audience and see if there's any other questions on any of the material to this point? This is probably a logical place for us to take a coffee break, here. There's coffee available in the boardroom next door, and then we can return at 10:15 and -- and embark on the next stage of this.

But if there's any other questions on the first content of this, we'd be happy to take those right now. Otherwise, we could feel free to move for coffee.

MR. CHRIS OAKLEY: I'm just wondering

-- Chris Oakley here -- wondering in the -- in the stage of evolution towards getting to sort of fulsome asset management process, how are you coordinating the current plans between the various parts of the company, the -- the distribution/transmission/ generation?

Do we see any of that reflected in the current filing, understanding that you're just starting the journey?

MR. JOEL WORTLEY: Could you help me understand a little better what -- when you say "plans," do you mean what -- what capital expenditures are planned for the next year, or longer-term planning, or...

MR. CHRIS OAKLEY: Well, the -- the capital expenditure's filed in the GRA. How much thinking has gone into the various ways that the different divisions value risk, for example? They all sort of take a different look at it, and some call it risk tolerance, and there's different usages of risk which I don't think are consistent between the groups.

Has some of the sort of centralized corporate strategic thinking been integrated into those valuations for this GRA?

MR. JOEL WORTLEY: So we'll get into

this a little bit in the next section, but the -- the corporate value framework is -- is going to be the standard by which we make those risk evaluations, and -- and value different capital investments.

It's currently being used in -- in generation. It's in the process of being rolled out in the rest of the Company. And so it's -- it's a partial yes. Some of the capital expenditures within the -- the forecast have been evaluated in that way. In the future, we -- the plan is to have them all evaluated that way.

MR. CHRIS OAKLEY: The -- I guess in particular thinking about the distribution side, since there's a lot of sustainment investment going there, how confident are you or how are you able to -- to provide us with the confidence that some sort of a corporate-level valuation has happened to justify the level of investment that's talking about going into distribution?

You know, obviously low-risk assets, but lots and lots of them, relatively low cost. It's an easy place to spend a lot of money if you haven't really got your -- your risk evaluation and your -- and your corporate values sorted out well.

MR. JOEL WORTLEY: So...

(BRIEF PAUSE)

MR. JOEL WORTLEY: There's -- there's a few different aspects to this. I'll start with the -- the corporate value framework is -- is the -- the consistent and broad tool that will be used to value -- value investments in the Corporation that will allow val -- a common basis for evaluation. And so it will help understand, Should I do this, or that?

Within a given group, and we'll take distribution as -- as the example, there are certain things that they need to accomplish. They need to serve customers. They need to connect customers. They need to make sure that customers don't experience blackouts.

And so a big chunk of what's in the -- the CVF is exactly what's needed to do that. And so you don't need the corporate value framework to tell you that that needs to happen, because it's more of a technical evaluation to say: What do I got to do to keep this -- connect this customer, and what do I have to do to keep this customer online?

The next part of that is -- is asset or program analytics, and we'll talk about a little bit in -- in the next section, which is an evaluation to

say: Within this asset class, within this population, how much investment do I need to make sure it -- that it -- that it stays reasonably healthy?

And that -- that's an analysis that again is done outside the corporate value framework in that it -- it's -- it's a very technical look at the -- the asset population, its health, what we know about it, what -- how we expect it to degrade, and -- and how much investment is required to mitigate that -- that degradation.

The corporate value framework might be used a little bit to say: I want to compare this program to that program. Which one is of higher value, or which one -- which one -- with which one can I mitigate risk more effectively, or what level of program should I be using to -- to mitigate that risk?

But the -- the real meat of the issue comes down to that -- that technical evaluation of what's required to keep the asset population healthy. And so that -- that's a great example of where a question to us such as, How do you ensure your popu -- asset populations are kept healthy, is very hard to answer.

A question such as, how do you treat -- or how do you manage your wood pole population, that's

one that we can answer.

MR. CHRIS OAKLEY: I guess that's a really good example. Wood -- wood poles is -- it's an issue for all Canadian utilities right now. And in a lot of cases, they will treat wood poles as run-to-fail. And of course, the risk when you -- when you stop treating assets as run-to-fail if -- if they aren't really critical assets, is you always take a certain amount of life off the table, and there's a -- there's a ratepayer cost to that. So you -- you have to have a good reason to take that life off the table.

The other problem is you get into a spiral with that, because as you take off asset life peremptorily, you now actually shorten the TULs, like the -- the actual calculations of what an expected life is. And, you know, run that to infinity, and you end up with a one (1) year life for anything. You put it in the ground; it's going to be retired the next year.

So, clearly, that -- that's sort of like a reductio ad absurdum, or whatever. But -- but how -- how do you value, for example in wood poles, what the risk basis is for replacing them before their service life is actually over? And -- and I mean, there's a lot of debate about when is a -- a pole

service life over? Some will say it's when the guys won't climb them anymore.

Very seldom do we actually see poles fall over on their own. It's typically a weather-induced sort of a thing, or a truck runs into them, but you know, if it's a weather example, if they have gotten very deteriorated and they're exposed to weather, they might fall over. Sometimes it's because a tree falls on them, and then it doesn't matter what the condition is.

So how do you assess, Okay, this is a condition of a wood pole for distribution line, and let's say it's a wood pole beyond the first OCR so it's at a place where it's going to get sectionalized off, even if it -- if it does fail -- if there's a failure on it. So you're not really affecting a lot of customers, and -- you know, I mean, there's SAIDI/SAIFI confi -- considerations.

How does that all come together in your wood pole replacement theory? Because there's a -- there's a big cost element here for wood pole replacements, and we just want to understand: How has that been tied into corporate risk? Why do you see that as a risk that has to be taken care of now because there are so many of them?

MR. JOEL WORTLEY: And -- and that -- that's a great question, and you're well beyond my technical knowledge. I -- I can't -- I can't ans -- I don't have the -- the information to give you directly. But it's certainly a question --

MR. CHRIS OAKLEY: We'll put it into an IR so you can --

MR. JOEL WORTLEY: Yeah.

MR. CHRIS OAKLEY: -- give it to the--

MR. JOEL WORTLEY: Yeah.

MR. CHRIS OAKLEY: -- area experts, obviously, but we -- but we'd still really like to know, you know, fine, we can talk about the technical details of why a wood pole replacement, or why a pole top transformer gets replaced, but what we want to find out is how that all ties into the corporate value, because if you just give distribution a pot of money and say, you know, Here's your $200 million, you know, spend it as you see best fit, how do we know $200 million is the right number?

I mean, sustainment capital often gets treated as a non-volitional thing. In most cases, volitional. You can -- you can defer some sustainment activities. There might be a risk to it, and you start watching your performance parameters and see how

they work out, but -- but you can't really say, Well, if we don't do this this year, SAIDI is going to go to hell next year.

I mean, you might have an ice storm, or you might have a -- a big snow storm and it will, in fact, do that, but it wasn't related to your -- your sustainment decision, as it were, so.

MR. JOEL WORTLEY: Yeah. It's about balancing performance, cost, and risk. And --

MR. CHRIS OAKLEY: Yeah.

MR. JOEL WORTLEY: -- and you're right, there's -- there's judgment, and there's grey in there. And -- and risk is a funny thing, right. You can -- you -- you can choose to take risk and everything works out fine and everyone's happy. And -- and you can have exactly the opposite happen, and -- and there's -- there's a randomness to it.

And so you'll never know whether you were right or wrong, just as you're pointing out. You can -- you can have a storm come and wipe out a bunch of poles, and -- and it masks or -- you can't see -- you can't go back and do it again to see if you would have gotten a better outcome.

With -- with the wood pole example, it -- it's about, first of all, efficiency, and that if

you -- if you replace one (1) pole at a time as they fail, it -- it's very inefficient. So replacing a run of poles at a time is -- is a more effective way on a per -- per pole basis of keeping cost down.

And it -- it's about keeping up, and that if you get to a situation where the large portion of your asset population is now failing coincidentally all at the same time, then you -- you're overwhelmed in your ability to put them back up.

And so you've got to manage the population to make sure that you -- you can -- it -- it does what you need it to do, and you can stay on top of it but also as efficiently as possible. And so that -- that's what you'll see behind a detailed answer in -- in wood pole management.

MR. CHRIS OAKLEY: So -- so, yeah. For -- so you're talking about an actuarial approach to it, and obviously when you're managing a huge fleet of assets like that you do sort of want to know what your expected life is so that you can long-term plan your budget for that.

But -- but again just age-based replacement of wood poles, I -- I mean, I have a pretty good familiarity with wood -- wood pole survivals which have gone in seventy (70), eighty (80)

years sometimes because they were in a good condition and, you know, they were in a good location.

So it -- just replacing them at fifty (50) years even, you've really wiped out a lot of really useful life that ratepayers are now going to pay for, that replacement so.

MR. JOEL WORTLEY: Yeah. And it's far more sophisticated than a simple age-based replacement.

MR. CHRIS OAKLEY: Sure. Thank you.

DR. BYRON WILLIAMS: Is this -- when you're asked IRs like that, I'm -- perhaps foolishly I'm presuming that how you make these decisions, how you prioritize, how you look at alternatives, is articulated somewhere. Am I being -- am I being unduly optimistic?

Like we -- we -- this is the -- the big black hole of Hydro that we've been struggling with in -- in -- maybe we're not asking the right questions but we're -- we're not getting how you do it.

MR. JOEL WORTLEY: I -- I understand, and I sympathize. To sit on the outside and look into Hydro, it -- it's very big, very complicated, and --

DR. BYRON WILLIAMS: But I would say it's -- if Hydro can't articulate it then we have

concerns that it's actually not doing it.

MR. JOEL WORTLEY: One of the -- one of the steps on -- on our -- on our journey here is to develop some templates and -- and do a more rigorous documentation of asset strategies. How are we going to manage this asset class? What are the -- what are the metrics behind whether performance criteria -- because we've been managing these assets for so long that -- that information exists. It just hasn't necessarily been documented on a template in a consistent format.

DR. BYRON WILLIAMS: This is -- just the last question I have be -- just going back to slide 22, and in your knowledge is it typical to do the development of strategy and policies before the implementation roadmap?

Is that a typical practice?

MR. JOEL WORTLEY: That's what was recommended.

(BRIEF PAUSE)

THE FACILITATOR: Well, if we've canvassed the questions, and -- to this point, it's 10:15. There's coffee available in the boardroom.

Why don't we break until 10:30, and -- and reconvene. Thank you.

--- Upon recessing at 10:14 a.m.

--- Upon resuming at 10:32 a.m.

THE FACILITATOR: ...here, and we can recommence. Thank you very much.

MR. JOEL WORTLEY: Thanks, Greg. So the next section here is to talk about our business operations capital planning process. And I want to specifically note at the beginning of this section that business operations capital does not include the major new gen and -- and transmission segment that you're familiar with within the capital expenditure forecast.

So there's been some changes in how we organize the -- the CEF. And so what used to be cut up into domestic and -- and Basic major has now been combined into one (1) heading, which is 'Business Operations Capital'. And under Business Operations Capital we have programs and projects. And -- and programs are annual recurring things, and projects are specific -- specific expenditures on -- on a given -- a limited scope.

Major new gen transmission is unchanged with respect to the -- the CEF. So this -- this is our capital planning model, and this is -- this forms the basis and is the diagram that I want to walk you through very -- very carefully because it forms the basis for sort of the -- the foundation for -- for our capital planning.

And so this gives the perspective of -- of what you can see out in time with respect to our -- our capital expenditures. And the -- the basic philosophy here is that you've got things that are way out in the distance, that are long-term planning investments here which are identified needs. You -- way off in the future you -- you know you're going to need to put some money into -- into some assets.

As that gets closer in time, you develop potential solutions to satisfy that need, but you -- they're -- they're not committed at this point. They're just potential things that might need to happen, and eventually they become committed and they turn into something that's actually being executed, which is in -- in the now or the immediate future.

And so -- and then you've got these recurring needs, which also again, on a -- on an annual basis, pieces are selected for actual

execution. That's -- that's the philosophy behind this model, and I'm going to go into it in a little bit more detail here.

DR. BYRON WILLIAMS: Could -- could we go back to that slide for --

MR. JOEL WORTLEY: Sure.

DR. BYRON WILLIAMS: So this is in effect as of when?

MR. JOEL WORTLEY: So this -- this is -- we started -- this has been implemented -- sorry, I'm just struggling a little bit, just because it -- it -- the -- the basic philosophy has always been there, that you see things coming, you develop them into potential solutions, and then you choose amongst those -- those potential projects to identify what you're going to do this year.

So that basic philosophy has always been there. The -- the cutting it up and the renaming of it into potential investments and -- is new in the last year.

DR. BYRON WILLIAMS: And at what level of the Corporation do we see this? So is this within the individual business units? It -- where -- where is this?

MR. JOEL WORTLEY: This is -- can we

come back to your question after I've been through the --

DR. BYRON WILLIAMS: Okay.

MR. JOEL WORTLEY: -- because I'm going to go through this a little bit more broadly, and then we can see if -- if I've answered your question or not, okay?

DR. BYRON WILLIAMS: Okay. Okay. And -- and just be mindful of, as well, is there a capital planning document somewhere? Like, you've got a model. Is there something that articulates this?

MR. JOEL WORTLEY: Okay. Let me -- let me see if I can answer that as we go here.

So we want to note that the -- the capital expenditure forecast is a snapshot in time, it -- and that on the day that it's printed or the day that it's assembled, it gives you an idea of -- it -- it's what we currently see looking forward.

And so it -- it will show things -- projects that are ending. So these are projects in flight that are -- that are ending in -- in year 1, for instance. It'll show projects that are beginning in year 1 that may have committed funding out for -- for some years.

And this forms the -- the executing

portfolio: So projects in flight, plus year 1 project starts, plus scope development. And scope development are the small amounts of money spent on some preliminary engineering to better understand a project, so -- or better understand a potential investment.

We've got an investment that's being considered, but the -- the scope has not been fleshed out. Therefore, the budget and schedule are highly uncertain.

So the idea would be to spend a little bit of money on some preliminary engineering to develop the -- the scope, firm up the schedule and budget, and therefore have a better idea of the value the project brings and its actual costs so that it can be -- before committing to actually doing it, so having a better idea of -- of its cost and -- and value before authorizing its execution.

MR. ROGER CATHCART: Quick question on that. Do you have a list of scope development projects that fit into these buckets, fit into these different -- potential versus long-term planning?

MR. JOEL WORTLEY: Yeah. So the --

MR. ROGER CATHCART: With assigned dollar values?

MR. JOEL WORTLEY: Yeah. Each of these will go through an approval process, and we'll have an approval document behind it. And I'll go through that in a -- in a little bit here. And so we -- we can identify --

MR. ROGER CATHCART: So you have a list?

MR. JOEL WORTLEY: We can certainly make one if we don't have one, yeah.

MR. ROGER CATHCART: Okay.

DR. BYRON WILLIAMS: And is the approval document -- like, that's a capital program -- or capital project justification? Like, is that the key approval document?

MR. JOEL WORTLEY: I'll go through that in -- in a slide or two (2).

MR. ALEXANDER BUKALEV: And a question: Do you have scopes developed for programs?

MR. JOEL WORTLEY: When -- so programs get -- get approved for funding, but then individual program items also get approved for funding. And so on an annual basis, the items to actually be -- to be executed get reviewed.

MR. ALEXANDER BUKALEV: So you do have scopes identified on an annual basis for each of the

program element?

MR. JOEL WORTLEY: The -- the program itself will be -- will be authorized once, and then on an annual basis, the -- the program items will be again authorized.

MR. ALEXANDER BUKALEV: Authorized in terms of the document, right? So you have --

MR. JOEL WORTLEY: Yes.

MR. ALEXANDER BUKALEV: -- something to sign off?

MR. JOEL WORTLEY: Yeah.

MR. ALEXANDER BUKALEV: Yeah? Okay.

MR. JOEL WORTLEY: So this -- this year 1 of the CEF becomes -- where those authorizations take place. If -- when you put the shovel in the ground or when you begin work is when you actually -- you need authorization to begin spending.

You look out a little bit further in time and you see that we've got some committed spending that -- that exists in that time frame. You've got the -- the program spending that's identified but not yet committed in terms of exactly what that money is going to be spent on, and a whole bunch of potential investments, things that might need

to happen, but have not yet been committed, but they have a identified scope schedule budget behind them.

And this becomes the portfolio of potential investments. And so that's sort of the hopper of things that we see coming that is constantly being reviewed and reassessed to say, Is this -- is this a high enough need to be started next year or can it wait?

And even further out in time we've got some potential investment items that extend this far out, but then a whole -- then the larger portion of this spending might be currently tagged as -- identified that there are liabilities within the -- the asset inventory that are going to need to be invested, but exactly what they are and -- I mean, they're not developed into -- into particular investments with scope schedules and budgets behind them at that time, they're just a budgeted spend.

MR. ROGER CATHCART: Just a quick question, how do projects get on this list?

MR. JOEL WORTLEY: There are a variety of work identification --

MR. ROGER CATHCART: Is there --

MR. JOEL WORTLEY: -- processes.

MR. ROGER CATHCART: -- is there a

time frame that this is usually done, or is it -- I'm just trying to map out the process, or is it ad hoc?

MR. JOEL WORTLEY: I mean, work identification typically is -- is ad hoc. The -- the reviewal (sic) and the -- the building of the plan is an annual cycle.

MS. PATTI RAMAGE: I'm sensing it -- it may be helpful if we could let Joel finish this section and then put the questions in at the end, because I think some of the questions are going to be answered in the section. And I -- I'm not in any way trying to avoid them, but I think if we just get through this piece and then stop for questions.

MR. JOEL WORTLEY: Sure. Good suggestion. So just to -- to summarize what we're looking at there, we've got three (3) portfolios here, which is the portfolio of executing projects, the portfolio of potential investments, and the portfolio of programs. And each of those is held -- and each of the operating groups as well as our corporate services group, they hold each of those portfolios.

And so they're -- they're -- they exist in distribution, transmission, generation as well as -- as corporate services. And each of them uses those different portfolios to plan their work. All those

projects are divided into investment categories. And investment categories are -- are relative new. The primary investment categories are shown here. And this is meant to give some context to where the money -- why the money is required.

And so the first is capacity and growth. And so these are investments required to expand the system and to provide for future load growth, or address capacity concerns. The second significant or primary investment category is -- is sustainment. And so these are existing assets that need -- need sustaining investment to deal with degradation or obsolescence.

And then there's a business operation support category, which is shared services like information technology, fleet, facilities, administrative tools, that kind of thing. So the -- the way asset investment planning gets done -- the way we want to do it at Manitoba Hydro is to not -- not have the situation where there's a bucket of money to be spent, rather to have a situation where the needs of the asset to accomplish our business objectives drives what expenditures are required.

So it's a needs based approach to say what -- what operational requirements exist, what

assets for filling them, and what ass -- what investments are needed to keep those assets functioning in that regard. And so it considers immediate operational requirements, but also long-term sustainability.

And it needs to achieve a balance of cost performance and risk and that's always a trade-off. You can always spend more money to get less risk, but there -- there needs to be a -- a reasonable balance there and that there's only so much money. There's only -- also only so much risk that can be acceptably taken.

So we've got two (2) objectives with respect to asset and investment planning. Objective number 1 is to optimize the timing and scope of projects. And so that's to optimize the timing and scope of projects that arrive in year one of the CEF for actual execution.

And so timing, of course, is about choosing when you're going to engage on a particular investment. Scope is about choosing which alternative, or which -- high, medium, low, which level of risk -- which level of performance is going to be selected within an individual investment.

Directive number 2 is to forecast long-

term capital investment requirements. And so that's -- that's forecasting how much money is needed out into the future. We're currently developing a roadmap to deliver this. And as discussed briefly earlier, we think it's about a three (3) to five (5) year time frame for doing that.

There are a number of steps required to actually achieve these objectives. We've got to build processes, tools, and data models, populate inventories, collect data. And once -- once we've got the systems up and running, we've got to calibrate them, refine them, and -- and build proficiency before we can actually optimize and -- and fulsomely achieve these objectives.

So we're working on that roadmap now. Part of the pieces that are going to form that roadmap are already in motion. And so one (1) of them is the Capital Portfolio Management Program. And so this is currently being rolled out across Manitoba Hydro, and will be completed by the end of this calendar year. And it's based on the capital model that I've already presented. It's a standardized set of tools and processes through which to do the -- the capital planning.

One (1) of the steps on the roadmap

will be -- that is currently underway is the documenting of those -- those processes. So we will have those available in time. Another portion that's underway is the development of a corporate value framework, and that was included in -- in the -- in the filing.

And so these things are -- are detailed a little bit further in -- in Tab 5 of -- of the -- of the GRA, and are currently underway.

DR. BYRON WILLIAMS: I'm sorry, Patti (sic). Like, is this best to describe as a prospective presentation? This is what Hydro's, over time, developing?

MR. JOEL WORTLEY: It's -- some of it is in motion. Some of it is existing. And this is where -- where the -- the situation is complex. So for instance, in -- in the generation area, this is largely in place.

DR. BYRON WILLIAMS: Copperleaf is in place in...

MR. JOEL WORTLEY: The -- the C55 software from Copperleaf will be rolled out in the other groups by the end of this year. But rolling it out and fulsomely using it are different things. And so to answer your question, some of it is in place,

some of it is perspective.

DR. BYRON WILLIAMS: And I'll listen patiently but we're still trying to understand -- we've got two (2) test years in play, and this isn't that helpful for understanding the justification for the two (2) test years. So that's our -- our challenge.

We don't know what you're doing, and -- and we heard it from our friends across the table as well, so that's -- but, please proceed.

MR. ROGER CATHCART: Just before you proceed, you're rolling it out at the end of the year. When do you expect it fully implemented?

MR. JOEL WORTLEY: So the -- the -- the rollout is underway. It'll be completed at the end of the year.

MR. ROGER CATHCART: And training?

MR. JOEL WORTLEY: And -- and training, yeah. So --

MR. ROGER CATHCART: When -- when is steady state? When is it going to be completely operational?

MR. JOEL WORTLEY: So -- and this is where we have to be careful in -- in our -- in what we're talking about. The actual rolling out of the

software and the processes behind it will be complete by the end of the year.

Once you've got those systems in place, you've -- you've got to -- you've got to populate them and build them up to the point where they're delivering the results that you need. And there are many steps behind that. And so you've got to identify the assets that are going to be -- for instance, that you're -- you're going to do condition-based monitoring on, you've got to develop the methodologies in which you're going to do that condition assessment.

You've got to gather the data. You've to develop the database from which -- the reference database of which you're going to compare your asset condition to a larger asset class, the degradation curves are going to tell you how the asset is expected to perform.

And so we think that's about a three (3) to five (5) year to -- to get it all mature and up and running. We're going to tighten up that -- or confirm that time frame in the roadmap that we're currently building.

MR. ROGER CATHCART: Do you have a Gantt chart that shows the rollout of this?

MR. JOEL WORTLEY: Yes. Yeah.

MR. ROGER CATHCART: Where are you on it, the left or the right?

MR. JOEL WORTLEY: We are on -- three-quarters of the way done.

MR. ROGER CATHCART: Okay. Thank you. And --

MR. JOEL WORTLEY: Roughly.

MR. ROGER CATHCART: -- how many dollars are assigned to this rollout?

MR. JOEL WORTLEY: I couldn't --

MR. ROGER CATHCART: I'm just -- just -- I'm just generally saying if you've got a budget and you've spent a quarter of the budget or half the budget, I look at -- I look at projects like this. I look at milestones, plus I look at how much money you've got to spend, and -- and when -- just to get an assessment of when you're going to have this up and running.

MR. JOEL WORTLEY: The -- the actual project to rollout the -- the tool is on budget, and --

MR. ROGER CATHCART: Well, I'm not worried about that. I'm more worried about -- I'm not even worried about any of this. I'm just more

wondering where you are. You say you can have the thing fully implemented by the end of this year, rolled out. Training, populating, how long is that going to take? A year?

MR. JOEL WORTLEY: And then that -- that's the three (3) to five (5) year window that we need to -- and that's the Gantt chart we need to build.

MR. ROGER CATHCART: Okay.

DR. BYRON WILLIAMS: And just one last question, and then -- I apologize. Because at least as I interpret UMS, we know distribution's the least developed. It doesn't present generation as overwhelmingly ahead on the -- the curve.

So at some point in time, how do we get generation -- like, what needs to be done in terms of generation as well to get it to competent within the meaning -- within the meaning of the UMS scale?

MR. JOEL WORTLEY: So the UMS report is a -- is a look at the -- the broad asset management picture. What we're talking about today is -- is limited to -- to capital planning or -- or asset investment planning, and so it's a much smaller -- it's a smaller subset of the larger pie. And so within that -- within that subset of -- of capital

planning, generation is -- is quite mature.

DR. BYRON WILLIAMS: Okay. So the -- the point you're making is you're focussing not on the -- the broader spectrum of asset management. This is one (1) subset of it?

MR. JOEL WORTLEY: That's right. So within this asset planning picture --

MR. ALEXANDER BUKALEV: Sorry, Joel. There -- there was one (1) other condition from UMS report to develop a roadmap to implement asset management practice as a whole. So with this investments that you have right now in asset investment planning, are you going ahead of the actual roadmap that is -- you'll be develop later? And what if -- if it's not aligned with the roadmap?

MR. JOEL WORTLEY: So the -- there -- there's a couple of different roadmaps here, which is another language issue, I guess. And so the -- the roadmap -- a roadmap will be developed as Phase 3 of the corporate asset management initiative to deliver the corporate asset management framework.

Within that framework, one (1) of the elements will be asset investment planning. In our interfacing with -- with UMS, we were able to confirm that the vision that we have and the work that we're

doing under asset investment planning is consistent with where we need to go. And so we're -- we're confident that continuing down that path will be in step with the overall corporate asset management roadmap.

The -- the second roadmap that we've talked about is the one to deliver this asset investment planning process to maturity within the Company. And so we've got the -- the program, which is the tools and the processes, being rolled out to the end of this year.

We need to build a roadmap that takes us from there to -- to mature and fulsome use of the tools and processes. That will be a subset of the larger corporate asset management roadmap, which will bring an asset management framework to the whole company.

MR. ALEXANDER BUKALEV: I just say that within the broader context of asset management implementation. Now you're actually spending money to implement the asset management.

And coming back to my previous question on the business case, whether those investments have been justified, so do you have a business case for this implementation of asset investment planning? I

believe it's millions of dollars to be spent on that, or -- or have -- have been spent already if you're three-quarters (3/4s) underway.

So what -- what benefits/efficiencies they're expecting that would cover for -- for the investments in these planning tools?

MR. JOEL WORTLEY: That -- the capital portfolio management program was -- was justified, like any other capital expense. And so there -- there will be a justification on file, to which we'd be happy to share with you if you want to ask for it in an IR.

So within the capital planning maddle -- model, programs down at the bottom here are for -- for managing grouped assets. So these are these large-volume asset classes, the populations that need to be kept -- kept healthy.

And these are -- are asset classes that are grouped by -- by class or by -- by function, an example being wood poles that we've already talked about. Another example would be underground cables, and underground cables can be injected with silicone to extend their life.

And so on an annual basis, to manage that population, a certain number of them need to be

injected before they deteriorate too far, and so you might have a program to do that.

And you need money identified to deal with your run-to-fail assets, like overhead transformers, that as they fail are -- are replaced. You'd have a program, a funding program to make sure that on a -- a reasonable basis, you've identified how much money is going to be required to -- to replace those assets as they fail.

So these capital expenditures are forecasted based on population sustainability and projected failure rates.

MR. ALEXANDER BUKALEV: So -- and I believe you have the risk-of-failure curves intact developed for each of those asset class?

MR. JOEL WORTLEY: We have -- we have a -- a number of risk and failure curves developed. I can't tell you off the top of my head exactly which -- which assets have them and which don't. So to -- to do that analysis is -- is a -- is a function called program analytics.

And that's to look at these large population asset classes and -- and manage their sustainability. When looking at individual assets, there's another function called asset analytics, which

looks at a -- an individual larger asset to say, When do we expect not to spend money on it? And so that's -- that's part of a -- of an ongoing cycle looking at the health risk, performance, and studying the system to say, What are the -- what are the needs? What are the needs of the system, which is an ongoing recurring activity, which identifies sustainment projects.

So these are sus -- needs -- and this refers to the -- the investment category of sustainment, existing assets that are going to need investment to sustain them. System growth and capacity spending, so this is where there's a capacity issue on the system to which expansion is required.

As these things are -- are moved forward in time, they get defined into potential investments, so an actual project is defined with a scope schedule and budget. They're joined in the potential investment portfolio with more operational needs, things that are not so visible from a distance.

So that could be a compliance issue, such as a change in regulation that is required or not -- not foreseen. And it could be things like customer connects, which often show up without a lot of warning.

From these potential investments, on an annual basis, projects are considered for execution. And if -- if the justification is sufficient, they'll be put into year one (1) of the CEF for -- to begin the following year. Programs work much the similar way, except for they -- they tend to produce a -- a wider variety of investment categories.

And so you can have, for instance, a compliance issue that is drawn out over time, if it's a -- a PCB oil -- retiring apparatus with PCB oil, that might be staged over a number of years. It could be a sustainment program that's looking at a -- at keeping a population healthy, or it could be money set aside for customer connects in a system growth scenario.

On an annual basis program items are identified for actual execution the following year.

MR. ALEXANDER BUKALEV: And far -- what's -- what's the difference between sustainment in programs and sustainment in long-term planning investments? Isn't it -- can it be considered as double counting, or what -- what's the difference?

MR. JOEL WORTLEY: Okay. In -- in terms of this picture, the way they differ is if you've got a -- a large number of small investments

required for sustainment, you might choose to put them into a program for funding purposes, whereas if you've got individual projects that are larger in nature and targeted at more the individual assets, they would each be identified as their own project.

So if they're -- if they're in the program, it's something that you think you're going to have to do repeatedly, you've got a number of assets that fit that definition, and you're going to have to chip away at them annually, and if they're in a long-term planning investment, it's more of a -- a larger investment and a single asset.

MR. ALEXANDER BUKALEV: Okay. How do you draw the line?

MR. JOEL WORTLEY: How do we draw the line?

(BRIEF PAUSE)

MR. JOEL WORTLEY: So it -- it boils down to a question of how -- how to manage that particular challenge within the operation and what's going to be more -- more effective. Is it -- does it fit well into a program where -- where it's being worked at annually, or is it really a one-off that

will get its -- its own consideration?

So it's a -- it's a situational assessment.

MR. ALEXANDER BUKALEV: So then how do you identify overall sustainment need of the company at aggregate level if -- this definition is not that clear where it is. So I -- I thought, honestly, that programs would identify this sustainment need because it's more or less related to renewals but it seems like it's -- it's not.

MR. JOEL WORTLEY: You're on the right track in that the -- the asset ana -- the program analytics will identify the -- the long-term required investment to keep the -- the population healthy, which is a -- which is a broad view at that asset class, whereas the asset analytics is -- is a more focussed look at the risks tied to a particular -- a particular asset. And so now it's watching it degrade and -- and predicting when it's going to need to be replaced.

So one is a collection of small things in the programs, and then the -- the asset analytics is a look at the -- the larger investments.

MR. ALEXANDER BUKALEV: If I remember correctly -- correctly your ten (10) year forecast, I

think that you don't have too much of investments in long-term planning investment section, but rather it fades away everything to the programs.

So it kind of -- it may skew the investment so it doesn't show the real needs that you will have in five (5), ten (10) years. So those long-term planning investments, how far actually you -- you are trying to plan? I guess it's major asset replacements. That's how I may draw the line between programs and long-term planning investments.

MR. JOEL WORTLEY: Yeah. We'll get into this a little bit further in -- in some subsequent slides, particularly the last section about forecasting replacement.

Part of what we're doing here in -- in developing the system and -- and rolling it out and, as we've talked about, needing some time to build the data, populate the as -- the inventories and -- and actually do the analysis is that we recognize that we need to more fulsomely populate that outlook. It's not there today, and that's work that needs to be done.

MR. ALEXANDER BUKALEV: So this picture that they show, it's not in place today. So those two (2) test years, they were not developed

based on this picture or ten (10) year plan that was -- or twenty (20) year even outlook that was shown in the filing is not based on this picture?

MR. JOEL WORTLEY: Again, it's -- it's -- what's changed is this -- this approach, this perspective has always been there that there are things you can see coming. As you watch them degrade and they -- and they -- their condition worsens, you start thinking about what to do about them. That perspective has always been there.

The terminology has changed and the -- the formulating of tools to more consistently do this is new.

MR. ALEXANDER BUKALEV: Just some other question. The target, how is it being defined?

MR. JOEL WORTLEY: So target definition today is extrapolation from historic experience on what's been needed to keep the assets running and healthy.

Going forward, we're moving to more of a needs-based approach where the -- there'll be a bottom-up assessment of what's required, and the -- the target will be an output rather than an input.

MR. ALEXANDER BUKALEV: So just to understand correctly, it's historic -- currently, it's

historical extrapolation of the past investments into the future.

MR. JOEL WORTLEY: If -- if you go out far enough in time. In the immediate future, it's about what's in front of us, what needs to be done in the immediate term to keep -- to keep the operation running.

MR. ROGER CATHCART: How do you define 'medium term'?

MR. JOEL WORTLEY: Sorry, the immediate term.

MR. ROGER CATHCART: Oh, immediate. Okay.

MR. JOEL WORTLEY: So the test years and the next two (2), three (3), four (4), five (5) years, those are -- those are things that you have right in front of you right now.

MR. ROGER CATHCART: Okay. Thank you.

MR. JOEL WORTLEY: Forecasting what's going on in years 10 and 20, that's significantly more challenging.

So when we move from planning to execution, we've got potential investments where we're carrying multiple alternatives, multiple solutions that are under consideration, each of which has a

scope, schedule, and budget. And therefore it can have a value assessment made as to what -- what it will bring to the company, but without a firm start date. These are things that are under consideration, but they have not been committed.

When they become executing projects, that means we've arrived in year 1 of the CEF. An alternative has been selected, scope development phase has been completed, if required, and we now have a confident scope, schedule, and budget, and therefore a value assessment and a firm start date to carry out the project.

These -- these are the documents that secure the approval for these expenses or these expenditures. So there's a capital investment justification document, the CIJ, and this replaces the former CPJ document, capital project justification. And it's the funding request required for a project, a program, or a program item and is -- constitutes the authorization to start spending or execute.

The capital investment concept document is new. And it's the request to fund a little bit of money for scope development, some preliminary engineering. And that's done to firm up scope, schedule, and budget before committing to the actual

spend. The authorization to spend happens here for scope development when a CIC is -- is approved, here for capital projects and here for program items.

MR. ANTOINE HACAULT: A short question. You said that the capital investment justification will be replacing capital project justification. So if we're asking for information do we include both descriptives to make sure we're catching both? When -- when is this change occurring?

MR. JOEL WORTLEY: The change has -- is in place now. And so, I mean, if you just ask for the justification documents we'll give you whichever one applies to the project you're looking at in that many of the projects -- most of the projects that are currently underway will have been justified using a CPJ. Going forward, they'll be -- the new ones will be justified using a CIJ.

MR. CHRIS OAKLEY: Are there significant structural differences between those -- those justification doc -- documents?

MR. JOEL WORTLEY: There's some detail differences but not --

MR. CHRIS OAKLEY: You -- you could map them between each other sort of?

MR. JOEL WORTLEY: Reasonably, yeah.

MR. CHRIS OAKLEY: Okay.

(BRIEF PAUSE)

MR. ALEXANDER BUKALEV: Just another question. In this capital justification, in both documents, so NPV doesn't depend on the timing of the investment. So what if we delay the project I take it the NPV would be changed?

MR. JOEL WORTLEY: So the --

MR. ALEXANDER BUKALEV: Or put it another way. If this project has not been -- was not approved last year but now on the approval table this year, would it be revised and new NPV would be considered?

MR. JOEL WORTLEY: So the -- the corporate value framework is used to assess the value the -- the project brings, including a look at the timing of the spending and its NPV, and so, yes, if -- if the timing -- the -- the value would be confirmed within the corporate value framework before committing to -- within the actual proposed timing of the project before it's committed.

MR. ALEXANDER BUKALEV: That's in the future. And currently those projects that have been

tabled --

MR. JOEL WORTLEY: The corporate value framework is --

MR. ALEXANDER BAKULEV: -- are coming both from the same process?

MR. JOEL WORTLEY: -- is in use in generation. It's rolling out in transmission and distribution and -- and corporate services. The -- the approval document, whether it's the CPJ or a CIJ, when it is approved it's approved for execution, and so it has the current timing in it.

When it's out there as a potential investment or it's -- or it's under consideration for execution, there's no firm -- firm timing associated to it, and so it -- it -- the approval document has not been written at that point. So the approval document is fresh when it's approved for execution.

DR. BYRON WILLIAMS: In terms of Copperleaf C55, that application; in making the decision to roll that out into other parts of the business or in the initial decision to implement it for generation was there any independent assessment of its strengths and weaknesses as a planning tool?

So would the Corporation, in developing its business case to roll it out, looked at the -- the

critical literature in terms of that specific application?

MR. JOEL WORTLEY: Again there's a -- there's a justification process that was followed in -- in justifying that project and that tool. I wasn't part of that directly, so I can't comment on exactly what was considered, but we can certainly provide that.

DR. BYRON WILLIAMS: So, yeah, we'll -- we'll be looking for the justification process for selecting that tool both for generation, and then for rolling it out, and any independent analysis of the strengths and weaknesses of that tool.

MR. JOEL WORTLEY: Okay. So moving into portfolio optimization. The point here is to select the alternative and timing of investments that deliver the greatest value while respecting multiple constraints. And so if we have a situation where projects are considered individually and executed based on what's best for the individual project you get a picture that looks something like this, which is that you've got overlapping spends -- overlapping projects and lumpy spends which is both hard to manage and doesn't necessarily bring the highest value to the Company.

And so what we want to do is arrive at a situation where spends are -- are paste and prioritized in respect of constraints. So the constraints at hand typically are -- are time, and that there are limits as to when you can do things, whether that's a compliance deadline that has to be met or whether that's the -- the opportunity to do two (2) projects in one (1) location that doesn't exist, and there will always be constraints regarding timing. Constraints of resources. You can only do so much work at once, and of course constraints of how much funding.

The value is assessed based on quantifying benefits, risk, and cost, and this is done using the corporate value framework. And so the corporate value framework is based on the mission of the Company, to provide safe, reliable, and affordable energy to the people in Manitoba, broken into these five (5) value streams, financial reliability, corporate citizenship, environmental, and safety.

And so within the financial value stream, the goal is to maximize cost savings and increase sufficiency. Within reliability is to maintain customer service, and increase customer satisfaction. Within corporate citizenship it's about

public perception. Environmental is about stewardship. And safety is about protecting employees and the public.

The corporate value framework breaks down into these twenty-seven (27) value measures, and this is described in a document filed within -- in the GRA, so I'm not going to go any further into that today.

Using these tools to optimize the portfolio considers net value,; value in cost, considers value gained per dollar; considers multiple project alternatives, considers different program levels; and considers the effects of project deferral.

The goal is to arrive at an executing portfolio that is optimized, a potential -- a portfolio of potential investments that's flexible, and a forecast of long-term investment requirements.

MR. ALEXANDER BUKALEV: So if you go to the previous slide, this optimization or prioritization hasn't been done -- done on -- across all business units?

MR. JOEL WORTLEY: So currently the optimization is -- is being done in generation. It will be -- it's -- will be a future step for both transmission and distribution as we complete the

Corporate capital portfolio and management program rollout.

And then in time we'll have to assess whether an optimization corporately across all groups makes sense, or how to do that optimization.

MR. ALEXANDER BUKALEV: It's not yet been defined how it will be done in the future, while at the same time the tools to do that are already on their way to be implemented.

MR. JOEL WORTLEY: It is being -- it's being defined how to do it within portfolios. The next step to that -- the next evolution to that will be how to -- how to optimize between portfolios.

MR. ALEXANDER BUKALEV: And portfolio definition would be?

DR. BYRON WILLIAMS: What is the definition of the por -- of portfolios by business units?

MR. JOEL WORTLEY: Each business unit has a -- has an executing portfolio, and has a potential investment portfolio.

DR. BYRON WILLIAMS: Is it -- presumably Manitoba Hydro has in its possession a comparison between kind of the vision as represented in these slides, and -- and actual. Do -- like do you

-- do you have a description or depiction of what you're doing now versus what you're -- where you're aiming to be in three (3) to five (5) years?

MR. JOEL WORTLEY: So this -- this is where we're aiming to be within three (3) to five (5) years across the Company. We are largely there in -- in generation, and on our way there in transmission and distribution.

DR. BYRON WILLIAMS: But how -- where are you in transmission and -- and distribution?

MR. JOEL WORTLEY: We're --

DR. BYRON WILLIAMS: Where is that visual depiction?

MR. JOEL WORTLEY: -- we're --

DR. BYRON WILLIAMS: Or and -- and that language? Where is that explanation?

MR. JOEL WORTLEY: We're rolling out the tools and processes by the end of this calendar year --

DR. BYRON WILLIAMS: But the -- the numbers that are underlying the test years, where is the description of the process that underlies the test years for transmission and distribution?

(BRIEF PAUSE)

MS. PATTI RAMAGE: Mr. Williams, just in term -- just to clarify, you're looking for, effectively -- these are the assets that are in place today. What process did they run through? Is that correct? Is it -- and what -- what's the documented process for the process that the assets in the test years were -- any -- those assets, what process did they run through in order to be put in place? Is --

DR. BYRON WILLIAMS: Well --

MS. PATTI RAMAGE: -- for the --

DR. BYRON WILLIAMS: -- we're -- we're being presented --

MS. PATTI RAMAGE: -- percentages and test years?

DR. BYRON WILLIAMS: Yeah. We're being presented with a -- a visionary depiction for -- for capital asset in terms of how a -- an optimized portfolio is developed. We're trying to understand, for the purposes of the test -- sorry. We're trying to understand, for the purposes of the test year for each business unit, how the optimized portfolio was developed.

MS. PATTI RAMAGE: And I'm going to try to help you with it, because I think Joel -- what Joel is here to do is address more of Manitoba Hydro's

forward thinking, because the -- to my mind, the issue we've heard in the past was we want -- we wanted to see more development of this. And this is to address what is being developed and -- and the steps that have been taken.

So I think this may be a better IR question, but in terms of pointing to you -- to the direction, is we would be looking at what's on the record in the past for those steps. But if you put it in an IR, we can try to gather together that documentation.

DR. BYRON WILLIAMS: Like, we've -- this has been a very difficult challenge we experienced in the -- the last GRA in terms of trying to understand how the optimized portfolio, which is -- presumably underlies the test -- test years for each business unit, is developed.

And so our -- our frustration is that we've struggled to see it articulated by the Cor -- Corporation. So we'll ask it. You -- you know what we're trying to get.

MS. PATTI RAMAGE: It's helpful to -- it's helpful to know what you're trying to get. I recognize the frustration. I -- and -- well, we're not testifying, so it doesn't matter. So I'll say and

-- and Joel can --

DR. BYRON WILLIAMS: It -- it's not -- it's not directed at this witness.

MS. PATTI RAMAGE: -- yeah. No, no. And Joel can address, but I -- I think the -- part of the answer is it was not centralized in the past. You have to go the very -- the different business units. Joel can attempt to do that.

I think you may hear from him that, as he took on this role, that was part of the challenge is finding those -- those sort of things and -- and those practices, and now he's centralizing them. So he's in large part here to address the concerns and saying, Well, this is what we're doing.

And it may not be Joel is the best person to be able to say what happened five (5) years ago to get us to the -- the process that went through -- we went through in order to get the assets that are included in the test years.

And I'm going to get off the mic and let Joel talk instead of me.

DR. BYRON WILLIAMS: Before Joel -- like, I'm not asking for his answer today. I'm asking for assurance from the Corporation that we can get analogous documentation in terms of how the optimized

portfolios were developed for the different business units for the purposes of the test year.

And that's -- so I don't want to put Joel on the spot, like, in the sense, like -- but I -- that's what I'm looking for from the Corporation.

MS. PATTI RAMAGE: And if that documentation exists -- we will be putting out a call to gather it, and if it exists, that's what you will get. I can't tell you what is out there. So -- so -- and -- and Joel may be able to -- to help to some extent, but that would be our -- our view is that you ask the IR, and then we will go attempt to gather that information.

MR. ROGER CATHCART: I just have one (1) quick -- quick question here. I'm looking at CEF-16. You're going to spend $525 million on sustaining capital in 2018, 80 -- 95 million in generation and wholesale. Is that the area that you've got this completely rolled out?

So four hundred (400) and -- the -- the balance would be under the old regime and --

MR. JOEL WORTLEY: That's correct.

MR. ROGER CATHCART: So if I look out five (5) years we expect to have all of these -- all of these under the new planning?

MR. JOEL WORTLEY: That's correct.

MR. ROGER CATHCART: How far out do I go until we're dealing with just things that you're going to start initiating, because this stuff -- you -- you have a -- some of these projects are multi-year, I understand. So --

MR. JOEL WORTLEY: Yeah.

MR. ROGER CATHCART: -- do I go three (3) years out before it's -- everything will be under a new -- the new regime?

MR. JOEL WORTLEY: That -- that's --

MR. ROGER CATHCART: I'm just trying to -- I'm just trying to go by the month -- the numbers, that's all. I'm not trying to figure out -- I'm not trying to pin you down on anything. I'm just trying to say, From this planning document, I got 2018, 2019, 2020.

And it's just the generation line that's under the new -- wholesale generation which is under the new -- you -- you -- we'll see a new budget next year under the -- under the -- the next planning cycle, I assume?

MR. JOEL WORTLEY: That's right.

MR. ROGER CATHCART: So we could probably see -- the vast majority is under the old

system and two (2)/three (3) years for sustaining capital, like just the time frame. When you start and initiate a project, is five years ago, or three years ago that -- of this -- of this nature?

MR. JOEL WORTLEY: The -- the practice is changing in that regard in that we're -- we're trying to do is get away from the -- the longer, broader projects to have more focused, smaller projects.

MR. ROGER CATHCART: Okay.

MR. JOEL WORTLEY: And so as that change takes place, that -- that time frame for how long -- a legacy or -- or project before it -- it wraps up will -- will shrink. And so it may be that there -- and we're -- you know, part of that is that -- that transition will occur -- exactly how that transition will occur is hard to say at this point.

But something like the -- you know, that three (3) to five (5) year time frame is -- is probably a reasonable expectation.

MR. ROGER CATHCART: You're doing transmission first?

MR. JOEL WORTLEY: Transmission, then distribution, then -- and corporate services are all under way concurrently.

MR. ROGER CATHCART: Okay. So you're not doing -- you're not rolling one (1) out, checking to see it's operating properly, and then doing the same, or are you just doing them all at the same time?

MR. JOEL WORTLEY: I mean, it -- it ends up staging a little bit and that they're -- they're not --

MR. ROGER CATHCART: Is transmission next on the staging, or is it -- I'm just used to looking at IT projects differently.

MR. JOEL WORTLEY: Yeah.

MR. ROGER CATHCART: You're rolling it out where next?

MR. JOEL WORTLEY: I mean, it's -- it's...

(BRIEF PAUSE)

MR. JOEL WORTLEY: So -- just so you have the Gantt chart.

MR. ROGER CATHCART: Yeah.

MR. JOEL WORTLEY: Transmission is -- is almost complete and customers -- or distribution is -- is ramping up.

MR. ROGER CATHCART: Okay. Thank you.

(BRIEF PAUSE)

MR. JOEL WORTLEY: Relative to the question about the -- the planning processes behind the current CEF, I think -- I think Patti is correct in that the planning processes used in -- are the historic ones and are -- are not consistent and -- and not centralized in the Company. That's where we want to go.

And so we need to reach into those individual areas and -- and get particulars about how -- how they -- they carried out that business and we can do that.

DR. BYRON WILLIAMS: Thank you.

MR. ANTOINE HACAULT: I'd just like to know where DSM fits in all of this, because it's listed in your capital expenditure section in 5.1 as -- there's major generation transmission, then there's just business operations capital, and another separate line is DSM. And we know that that's eventually going to be transitioned out of Manitoba Hydro, but could you just explain for the current two (2) years that are the test years, how the Corporation is dealing with that for the time being?

I don't know if that's part of this

optimized portfolio, or how it fits into it?

THE FACILITATOR: I'll -- I'll make an attempt at that. I would not see DSM as falling under this umbrella. The DSM values that are contained in the capital budget flow from the 2016 DSM plan. So -- so I think that interrogatories asked of DSM planning will identify how those values were developed. And they basically appear in the capital planning -- or in the capital forecast, but they wouldn't be driven or associated with the processes that we're speaking of here today.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So the last section to go through this morning is around forecasting replacement. So as we described with a bit of a in-home example; I have run to fail assets which are non-critical assets with a sor -- short time frame for replacement, which means they're typically low-cost or common stock items where a failure of consequence is acceptable and the optimized life cycle for this asset is to run it to failure.

And a good example on utility is a pole top transformer where the effort to monitor their

condition and proactively replace them far and away out -- the cost far and away outweighs the minor inconvenience to a handful of customers when they fail.

MR. ALEXANDER BUKALEV: Just a question. How -- how do they define that the best optimal life cycle is run to failure?

MR. JOEL WORTLEY: So that is -- that is work take -- undertaken by the technical experts in the given areas to look at their asset and their asset classes, look at the business objectives behind the asset to say what do we need this thing to accomplish, what risks and benefits are associated thereto, and what's the -- the economic solution to managing this asset.

MR. ALEXANDER BUKALEV: So I guess there -- there could be some document that exists to justify whether it's run to failure or any other strategy behind each of the asset class?

MR. JOEL WORTLEY: One (1) of the steps on our -- our roadmap in this respect is to -- is to document asset strategies. The asset strategies obviously exist since we've been doing this for decades, but there may not be a templated description of that -- of that strategy.

MR. ALEXANDER BUKALEV: Do you think there is a document that would describe it, maybe not template it, some other --

MR. JOEL WORTLEY: I don't know off the top of my head. The -- an alternative to run to fail is -- is proactive replacement, as we described a little bit. And so this is a risk assessment and prioritization of which assets needs to be replaced. And that risk is calculated based on a probability of failure and consequence. And so the probability of failure is calculated from a health index which considers the effective age rather than the chronological age of -- of the asset.

And when the risk cost exceeds the replacement cost we'd say the asset is at economic end of life and it's going to be advantageous to replace it rather than continue a growing risk of keeping it in service.

DR. BYRON WILLIAMS: Can -- can I just ask here? If you've got something like poles, you did that survey with whatever, seven hundred thousand (700,000) between '03 and -- and 2010. For poles, the only effective data you have is -- is age, right? It's not effective age, it's -- it's their actual age?

MR. JOEL WORTLEY: I -- I'm not

familiar with all the details, but we do have an assessment methodology for poles that goes beyond age. And there is a strategy behind pole replacement to keep up with -- with that population. Again, I think that would be something that we could give you more information on in an IR.

Poles is -- you know, gets a lot of attention because it's an easy one to talk about, but it's relatively, or in fact, a very small portion of the overall spend, even within the distribution portfolio. Far and away the -- the biggest driver of -- of expenditures there is -- is capacity and growth.

And so those sustainment spends on things like the -- the poles are -- are relatively minor in comparison.

DR. BYRON WILLIAMS: Just looking at Kinectrics and UMS, that was one (1) of the narratives I thought I observed in -- in both reports was an -- a reliance on -- on age as a primary factor which -- which impaired the decision making process.

Is that a fair statement, a fair characterization of those reports?

MR. JOEL WORTLEY: Those reports identified gaps in condition assessment meth -- methodology but also plugged many of those gaps in

terms of the work they did for us, particularly Kinectrics. And so there's been a significant advancement in -- in the condisin -- condition assessment methodology on a number of asset classes.

MR. ALEXANDER BUKALEV: What is the definition of 'economic end of life' in this case?

MR. JOEL WORTLEY: Sorry? I -- I didn't catch that.

MR. ALEXANDER BUKALEV: What -- what is the definition of 'economic end of life'?

MR. JOEL WORTLEY: So the -- the economic end of life is -- is when the -- the risk cost of keeping an asset in service outweighs the replacement cost.

MR. ALEXANDER BUKALEV: Replacement cost meaning the pole is ten thousand dollars ($10,000) to replace, risk cost exceeds this ten thousand dollars ($10,000) mark?

MR. JOEL WORTLEY: The -- it -- it's not simply the -- the capital cost. It's the -- the life cycle cost of the asset from an operational perspective. So if we -- which is the right year to replace the asset in is the year at which the incremental cost balances risk versus replacement.

The -- the -- I mean, it's -- it's a --

it's a detailed calculation that we can -- we can get for you if you'd like to see it.

MR. ALEXANDER BUKALEV: Yeah.

MR. JOEL WORTLEY: Again, that -- that would be a good question to -- to put in an IR.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So assets die in other ways than -- than deg -- degrading to failure. Obsolescence also is a reason why ass -- assets come to end of life. And so you can have a functional obsolescence, which is when an ass -- an asset no longer meets performance criteria. So the -- the criteria has changed and the asset is no longer capable of providing the -- the required function.

And so an example might be some protection equipment that still operates according to its original spec, but the fault levels required to protect against have risen such that that asset no longer is suitable for the purpose, and needs to be replaced.

You can have technical obsolescence, which is when an asset is no longer supported by a vendor, or spare parts are no longer available, such

that you can't keep it in service. And so that can occur with digital equipment, where a vendor abandons the -- the version, or abandons the -- a particular model, and it needs to be -- it can no longer function.

We can have regulatory obsolescence, where an asset no longer meets the regulated minimums. And we have lots of examples of that, whether it's environmental or safety requirements, where the asset is still functioning, again, according to its oris -- original specification, but is no longer suitable for the -- the purpose.

So of the assets that we do want to monitor condition on, we perform asset condition assessments to evaluate the phys -- physical condition of the asset. And there's a methodology behind that which is specific to each asset class. How we are we going to measure the condition of this particular asset?

So it's a collection of parameters and waiting factors that would describe what things to measure, what inspections to do, what tests to perform, that when pulled together, turn into a score describing the condition of that particular asset.

An asset health index now brings con --

context to that particular asset condition. So it gives an assessment based on that condition of the remaining life of the asset, the probability of failure, and if there's enough -- enough industry experience with that asset class, an idea of how it's likely to degrade over time.

And so that's an assessment that's based on the specific characteristics of the asset you're looking at, its current condition assessment, and its operating context. How do you expect to use the asset for its remaining life?

And so it begins -- this risk assessment begins with an assessment of the condition of the asset, which is compared to how we would expect an asset in this class to function, and that's informed by both industry experience and Manitoba Hydro's own experience.

(BRIEF PAUSE)

MR. JOEL WORTLEY: Again, how the asset is utilized is a significant variant -- variable in this equation in that if it's -- if the asset experience database is founded upon lightly used assets, and you've got a heavily used asset, you're

going to find that the correlation to industry experience does not exist.

On this basis, an asset health index is calculated, which gives an indication of remaining life probability of failure, which doesn't mean much on itself. It needs to be combined with an asset -- assessment of the criticality asset. So there -- the probability of failure with the criticality, and hence consequence, gives you the actual risk behind having that asset in service.

The asset utilization and its criticality are all about the operating context. Where is this asset in your system? What does it do for you? How heavily utilized is it? What is its operating environment? All of which are particular to the asset in question.

The other thing that comes out of here is degradation curves, which are an input to the asset analytics, and this is the -- the analytics we talked about earlier that are used to model how the asset is likely to behave over time and model its risk in time.

Using those as inputs, you can calculate how risk is going to change for various levels of investment. This is a -- a useful tool, but

it has limited applicability, and so it's limited to assets with large capital replacement costs. It wouldn't -- it's not worthwhile taking the effort, or putting the -- the -- spending the money to do all the assessment and analysis on -- on smaller assets.

Assets with a significant consequence of in-service failure, have to be assets with a measurable condition, and has to be -- there has to be a model available of -- of industry experience to use -- to predict degradation and probability of failure. And that -- that's a fairly narrow definition. There's not all that many assets that fit into that definition.

Program analytics, which is a look at the larger population's smaller assets, uses the health and degradation curves to forecast population risk in time and can again assess the changes in risk with varying levels of investment.

So when we think about, again, the -- the supply chain, and the -- and the depth of asset here, and the -- the relationship, which assets are going to be good candidates for this type of forecasting, in this example, we'd say that the generating units themselves have major components with measurable condition, industry database that is useful

for comparison in determining how those assets are likely to degrade, and therefore, to be able to measure or forecast the risk of having those assets in service.

But as you get in behind that, into the auxiliary systems and the structures of the infrastructure, there's a lot of assets there that don't fit well into that model. And so the structures, for instance, are -- are a very significant cost, but they're also a very long-loved -- long-lived and -- and slow -- slowly changing. And so to rigorously monitor them and try to predict exactly when they're going to need to be replaced doesn't bear a lot of fruit.

And if we looked at just an -- an example, and this is just one (1) year, it's fiscal year 2017 or to CEF-16, we looked at where -- where is the spend, where's the money going, we can see that we've got 34 percent in capacity and growth. And that's largely expansion of the transmission and distribution systems to deal with capacity issues and customer connections. We've got 53 percent into sustainment, which is a combination of system renewal, mandated compliance, and system efficiency.

Really, these renewal investments are

the only ones that might be forecasted through analytics of this nature, and even then, only -- only a -- a portion of them. So, overall, in the -- in the big picture, the following of condition to predict asset failure and therefore forecast spend on renewal is a small portion of the overall spending pie.

DR. BYRON WILLIAMS: What's -- what's the small percentage? So of that 53 percent, how much?

MR. JOEL WORTLEY: So the -- the 39 percent are -- are potentially --

DR. BYRON WILLIAMS: Got it, sorry. I misread it, sorry. Thank you.

MR. ALEXANDER BUKALEV: Okay. That's in the future. So this forecast and replacement methodology that you show or potential things that could be considered for replacement, it's something that you believe is in the future but not currently?

MR. JOEL WORTLEY: So there -- there's -- I -- I think there's -- there's two (2) parts to the -- to your question, the one (1) being the -- the forecasting. And so the forecasting of future expenditures and investments levels based on condition, that's something that we're working and -- and is future.

The decision to execute a project in the near term based on -- on an operational requirement that considers the condition of the asset, its operating context, and therefore, the probability of its failure and the consequence of its failure, that's current. The forecasting of what those expenditures are likely to be into the future is to come.

MR. ALEXANDER BUKALEV: There are some other assets, facilities, IT assets, fleet. They -- is there a vision to include them in the same framework to look at probability risk assessment and to do the replacement forecasts in the future based on the same principles of asset management?

MR. JOEL WORTLEY: So, currently within the Capital Portfolio Management Program, information technology is included. We are in the process of -- of considering whether -- how to incorporate fleet and corporate facilities into that view.

So the -- I guess the short answer is, Yeah -- yes, the -- the vision is to bring it all together such that the -- that we have one (1) centralized and consistent means of -- of planning capital. The specifics of how that's going to roll

out in corporate facilities and fleet has yet to be developed.

So forecasting capital expenditures in this sense is challenging and -- for many reasons. The timing of asset failure is uncertain in that the operating context may change.

When you look at the history of an asset and try to forecast it into the future, you may find that you're -- the -- the duty cycle on that asset has changed over time. Or you may find that the environment in which it operates has changed over time such that its past performance is not a good indicator of its future performance. And so that can lead to uncertainty as to when failure is going to occur.

As the asset degrades, there may be consideration given to risk mitigation or life extension works. And that it might not be the same view of when an asset will fail and how it will fail that is given today may be mitigated or changed along the way such that that expenditure doesn't come to pass as forecasted.

The scope of the replacement is -- is uncertain in that, until you build out a particular project and fully examine how you would do the job, what's required, the scope is uncertain.

Plus there's likely to be changes between now and -- and the forecasted date of replacement in technology, what equipment we're going to put back in. Is it going to be the same one that's there today? Probably not.

How have codes and standards changed that might affect how you would do the job or what kind of equipment you'd put back in? And how have methods changed? -- all of which could impact the scope of the project and therefore its cost.

And of course costs are -- are highly uncertain into the future. It's challenging enough to predict market conditions and what a contractor is going to quote on a project months into the future, never mind years. And that forecast uncertainty increases as you go out in the time. And so the further you're trying to forecast into the future, the fuzzier it gets.

So to wrap things up, overall, I hope I've left you with an idea or a better understanding of the -- the supply chain that is Manitoba Hydro and how it's complicated by a broad mix of assets, with regional growth challenges and some degradation on the distribution system that needs to be checked.

We've got some corporate asset

management work underway to centralize and form a framework for business alignment; significant improvement underway in our business operations, capital tools, and processes; specifically in the asset investment planning, capital portfolio management, and asset condition assessment; and that, although we have a vision for forecasting asset replacement, using asset analytics and program analytics, it is limited in its application.

And as with any forecast, there will always be an inherent uncertainty into when those expends will actually happen.

DR. BYRON WILLIAMS: One (1) thing that would be helpful, at least in the literature I've read, there's also an interaction between capital and -- and maintenance. And you've not talked much about that today, so maybe if you can just at a high level where that is today and then where the -- the vision is.

MR. JOEL WORTLEY: So incorporating a life-cycle view of the asset I think is what you're talking about and getting an optimized life cycle such that the appropriate amount of maintenance is spent to -- versus capital to optimize the -- the life cycle of the asset.

DR. BYRON WILLIAMS: And just so I'm clear, what I'm trying to -- some of the literature -- the examples I've seen from other jurisdictions, they're looking at, you know, can I cut down more trees?

Like is that a better -- in -- in terms of that portfolio of measures to enhance the -- the life of assets, that kind of -- those kind of activities can be very valuable. And -- and I think in the lit -- in what we've seen from UMS, there's perhaps not the best coordination going on in terms of that.

So perhaps you can talk a little bit about where the Corpora -- Corporation is today and then how, if it all, your team plays a role in -- in that.

(BRIEF PAUSE)

MR. JOEL WORTLEY: So what we've talked about today is -- is -- it's been specifically about capital planning. And so what you're describing is -- is a step beyond that and is a-- and again, fits under the -- the broad asset management umbrella, but is beyond today's discussion.

And so to give a very quick and -- and broad characterization of it, there -- there would be -- how this is utilized or how it's done within Manitoba Hydro would vary from area to area. And part of the -- the future and part of the road map that we'll be developing under the corporate asset management initiative is to identify what is best practice in that regard; roll out a consistent standard process, standard tools for -- for detailing asset strategies that consider both maintenance and capital in the life cycle of the asset.

So today it -- those -- some of those practices and processes will be existing in different groups, but it'll be a future step to centralize them and standardize them.

DR. BYRON WILLIAMS: Will that be -- will that be through your team that is...

MR. JOEL WORTLEY: My team will likely coordinate the endeavour with the -- the technical experts and the workmen on the ground out in the organizational groups.

DR. BYRON WILLIAMS: And has Manitoba Hydro tried to consolidate its understanding of what's being done in terms of that interaction between capital and maintenance in -- in each business unit?

MR. JOEL WORTLEY: To -- to date, the -- in terms of assessment of current practice and the GAAP analysis, it's the EMS report.

MR. CHRIS OAKLEY: Hello, Chris Oakley here again. Had -- have Manitoba Hydro benchmarked itself against pure utilities to see the ratios of OM&A expenditures versus capital spend, just given the relative condition of the fleet and that sort of thing?

THE FACILITATOR: On -- on one (1) hand we've had some bench working (sic) that was done last year by the Boston Consulting Group as part of their engagement to the Manitoba Hydro Electric Board. It was done probably at a -- at a higher level, but it was done for each operating unit at that point in time. And that's a set of data or some materials we will be providing into this process here in the near future, but we're just going through some matters with Boston Consulting right now to be able to get those materials assembled and finalized.

MR. CHRIS OAKLEY: Thanks. I -- I had another question, if I could, about something that Joel said a little bit earlier on. In the past I think you said the -- the -- basically the target or the envelopes were -- were basically an extrapolation

from historic. And I get the sense from this discussion that you're kind of gravitating to a different place. Eventually it won't be based on that sort of a thing.

But likely the -- the two (2) test years we're looking at will have at least a certain amount of that flavour in them. Now, you said something that was interesting, which is your -- your immediate investments are based on what is in front of us now.

And I -- I want to check a little bit about what that actually mean? It -- it seems to be classifying things as non-volitional. In other words, I've got stuff in front of me. If I don't do that the wheels are falling off. Is that really the case? Like let's think about, say distribution.

You -- you've got a lot of these really low cost, but vast numbers of these units that you're looking at -- at going after. You don't really have a lot of data on some of them. So there's some judgment here I think that probably has to be informed by -- by past investments. But is it really as non-volitional as all that?

I -- I know it's -- it's alway nice to stay ahead of your -- your demographic curves and you

want to try and balance these things over time, but at the particular time we have the kind of the pig and a snake issue, which is there are some very large projects kind of going through the works right now and if there was an opportunity to defer anything, this is a really good time to think about it.

MR. JOEL WORTLEY: So when -- when I say that it -- it's the work that's in front of us now, it's the work that's urgent, or the work that is -- that is high priority. I think you're correct in suggesting that in -- in each case there's -- there's a judgment call as to when you're -- when you're going to do that project with a balance of -- of cost performance and risk.

And -- and there can be a conscious decision to take on more risk where -- where appropriate and that each one (1) of those -- each one (1) of those decisions to spend has a justification behind it and has a reason why it has to be now.

MR. CHRIS OAKLEY: Another sort of related issue is you -- you had -- I'm sorry. You --

MS. PATTI RAMAGE: Just hold for one (1) second.

MR. CHRIS OAKLEY: -- you had mentioned, I forget on which of the slides it was,

that -- that there was sort of an optimization process that goes on. It looked like you were looking at different scenarios before, you know, the -- it turns into CEF.

Have any of those scenarios ever been kind of put forward to say: You know, we could do this scenario 'A' and it's going to result in this sort of SAIDI/SAIFI results? We could do -- scenario 'B' turns into these SAIDI/SAIFI results.

Have -- has any of that sort of information been provided?

MR. JOEL WORTLEY: When I talk about the capital portfolio management program, those are the tools and the practices and the -- the processes that we need to do exactly what you're describing.

And so to date we haven't had the ability to easily produce that type of scenario analysis such that we could compare easily back and forth. But that's exactly the vision, to be able to get to a point where we can understand what -- what cost benefit and risk is associated with a certain investment level to vary that investment level to see what -- what changes and -- and ultimately -- it all -- at the end of the day it always boils down to someone's judgment call as to what is the appropriate

level.

And the -- the vision is to get to a place where that data is easily produced such that the right people can make that call.

MR. CHRIS OAKLEY: Have you done any -- any outreach sessions with -- with your customer base to sort of say, How are you with your reliability right now, or -- or what are things look -- you know, what drivers do you see that -- that you want Manitoba Hydro to -- to take action on. Have you done any of that sort of outreach?

MR. JOEL WORTLEY: My -- my end of the business is not the customer end. I -- I couldn't comment directly. I don't know if...

THE FACILITATOR: I would think that that's probably a question that we would be going to our customer care folks. We do some routine general survey work in terms of customer satisfaction, and -- and I don't have the information.

I don't have an answer for you off the top of my head but, you know, we have done some of that in the past. I'm just not sure where we are currently with respect to that but, you know, it's a legitimate question to find out for sure.

MR. CHRIS OAKLEY: Thanks.

DR. BYRON WILLIAMS: I guess just with one (1) follow up.

In terms of the development of targets and SAIDI/SAIFI, et cetera, would -- would it be your expectation that consumer input would be one (1) element of the development of those targets?

(BRIEF PAUSE)

THE FACILITATOR: Byron, if I might. We have a new vice-president of -- of customer care who has -- will be undertaking some analysis in terms of overall value that the Corporation of Manitoba Hydro is providing to customers. I think that -- that that may be one (1) aspect of it but I think that there's a much deeper set of questions that will be considered as we go forward in terms of the value that Manitoba Hydro is providing to customers.

And so I -- I don't know specifically -- like I think that's a question that -- in terms of a customer value there will be a component of that. But it's safe to say that with the restructuring that we've undertaken in the organization, one (1) of the key components of that is a different or a -- you know, a more forward-looking focus on the customer.

There would be likely some consideration obviously for some direct input from customers, or some way of sampling what customers desire, require, and value in that regard. So I -- I would view that as being probably a much broader subject that just simply distribution reliability, or -- or system reliability alone. But will take into consideration a number of different variables that customers could value.

And so right now I -- we're early in the stages of that, too. We've restructured. We're early in the stages of that, and that's something that we'll be -- we'll be embarking upon over coming time.

MR. ALEXANDER BUKALEV: The -- the corporate value framework that has been developed already, did it incorporate any customer research or studies in terms of their value?

MR. JOEL WORTLEY: The -- the customer experiences is considered in the corporate value framework, and you can -- you can read about that in the documentation that's been -- been filed.

And I guess I would suggest that you start there, see what -- see what you can learn there. And then -- then if you have particular residual questions coming out of that, that we can try to

answer them. I can't speak to specifically what studies were included or -- or, you know, the -- the actual genesis and specifics in that respect.

MR. ALEXANDER BUKALEV: I read it; I guess that's why I asked this question because I didn't see it there.

MR. JOEL WORTLEY: So what -- what exactly are you looking for?

MR. ALEXANDER BUKALEV: So let's say there's customer interruption costs, right, in this corporate value framework. So is it based on some research that was done by Manitoba Hydro, or it was taken out of...

MR. JOEL WORTLEY: I see. So again, a great question to put in an IR. I don't know the answer off the top of my head, but certainly we -- we can find that.

MR. ALEXANDER BUKALEV: Another question is in terms of the capital planning framework. So you offset investments for the next year, so at least you propose a certain level of investments with specific projects.

Do you forecast SAIDI/SAIFI into the future based on the already proposed set of list of projects?

(BRIEF PAUSE)

MR. JOEL WORTLEY: The -- the linkage between specific projects and an overall impact on SAIDI and SAIFI isn't there today. That's -- that's again something that will need to be developed within a larger corporate asset management framework to have -- to understand what are the -- what are the factors behind SAIDI and SAIFI, and which ones of them can be impacted by a particular project?

That -- that could very well end up being where we -- where we go with that corporate val -- or that corporate asset management framework, but it's not there today.

MR. ALEXANDER BUKALEV: do you have an overall forecast of SAIDI/SAIFI into the future without specific linkage to specific projects?

MR. JOEL WORTLEY: No. Currently, SAIDI and safety -- SAIDI and SAIFI are a -- followed as a lagging -- a lagging indicator.

MR. ALEXANDER BUKALEV: In the future, so this slide where it showed different investment categories -- sustainment, capacity and growth, business operations -- so are you planning to prioritize projects within each of the portfolio?

Or it doesn't -- it doesn't matter where the project belong to; they will be prioritized or lumped together into the bucket and then, based on the values, would be prioritized 1, 2, 3, 4, and then those ones that limit the budget will form after that these portfolios?

MR. JOEL WORTLEY: So I'll answer the question I think you're asking me. You can tell me if I get it right or not. So the -- the investment categories are -- are purely a reporting function. So what investment category the particular spending ended up in is -- is information rather than a driver or a limitation or an input.

And so the -- the portfolio of executing projects is a program based on the -- on which projects bring the highest value to the company within the constraints at hand. And if that ends up being irrespective of -- of what investment category the spending is in.

So -- so each -- each group will -- will build their executing portfolio on the basis of what is needed for their business objectives. And then there'll be a reporting function to analyze that to say, Overall, within the capital expenditure forecast, here's the total value -- total sum going to

sustainment, total sum going to capacity and growth, so on and so forth.

MR. ALEXANDER BUKALEV: So what I hear in that, you're going to compare capacity project versus sustainment project.

MR. JOEL WORTLEY: That's right.

MR. ALEXANDER BUKALEV: So let's say wood pole replacement versus building a new distribution station.

MR. JOEL WORTLEY: Yeah.

MR. ALEXANDER BUKALEV: And would you compare building a new distribution station versus building a new transmission station? So within different units as well this prioritization will happen?

MR. JOEL WORTLEY: So in -- in today's model, the optimization will occur within the distribution portfolio, and the optimization will occur within the transmission portfolio. But the -- there will likely not be -- and I -- I say 'likely' 'cause we have to plan this out -- an optimization of the two (2) together.

What will -- will likely happen is more of a levelling process by which the two (2) are compared to say: What -- what was the -- the value of

the last dollar spent going into this portfolio versus the last dollar spent going into that portfolio? to see if they are -- are roughly balanced, and if -- and if they're not, some adjustment in future years.

MR. ALEXANDER BUKALEV: Thank you. And then could you describe the process in more detail for sustainment identification? What's about -- do you -- do you have a similar description of capacity planning process, IT planning process, fleet planning process, facilities planning process? That's all.

MR. JOEL WORTLEY: So tho -- those planning processes will vary by group. The -- the transmission system planning process is probably the -- the easiest one, and then the -- the largest effort. But each of those groups will have a process by which they plan their work, of course.

I can't tell you about them in detail off the top of my head, but if you wanted to submit an IR, we can certainly dig that up.

MR. CHRIS OAKLEY: Just a -- just a couple more questions here for clarification purposes. There was a slide, and I wasn't quick enough to grab the number, between 25 and 30, but it -- the -- one (1) of the statements on it was, Asset needs drive capital expenditures. And I think that's looking

forward again. You want to get to the point where asset needs are going to drive your capital expenditures.

I -- I took that to be short of shorthand, because it seems to me that ratepayer needs should drive everything. And then if the ratepayer needs that asset to work, then -- then asset needs step in and -- and function as that. So I took it that was sort of an engineering-centric way of saying what I just said, but can you confirm? Like --

MR. JOEL WORTLEY: Yeah.

MR. CHRIS OAKLEY: -- we can't lose sight of the fact that there's someone paying the bill here, and -- and engineers love to have nice -- nice, new shiny things. I know that I'm an engineer, and I like nice, new shiny things, and I'd rather wholesale replace something than just put a patch on it. But -- but my ratepayers will -- will be concerned if I'm just putting new shiny things in.

MR. JOEL WORTLEY: No, you're -- you're entirely correct. What that was meant to be was showing a -- a contrast to a -- a model by which a -- a certain pot of money's doled out and it's just spent, and so rather a needs-based approach to which what does the asset need, but what does the asset need

to accomplish the business objective, and the business objective being to serve the customer at a reasonable cost, again -- again, balancing performance cost and risk.

MR. CHRIS OAKLEY: Thanks. I -- I figured that was what -- what you meant, but I just wanted to clarify.

THE FACILITATOR: I guess I would canvass the room one (1) last time to see if there's any -- any other questions. Brady...?

MR. BRADY RYALL: I may take you up on the offer of a glossary, but not maybe with the terminology that you showed on that initial slide. When we go to start explaining this to the Board members, I think it would be helpful to have a glossary of the terms and, you know, the capital asset management, the -- the overall asset management process, corporate value framework, have all these terms, how all these pieces are fitting together, and whether that's -- a flow chart isn't the right word, but a -- a map that would -- that would look like that.

And we'll -- we'll put this into an Information Request, but I think that's going to be very valuable, helping everybody. Okay. There's a

lot. Like, we went through slides after slides to explain all this stuff. And if this terminology's coming out in the hearing to explain what you're doing, we're quick -- quickly going to lose a lot of people, so that, I think, is an important one.

DR. BYRON WILLIAMS: Bra -- Brady, can I ask? Are you talking about what they're doing? I'm presume you're talking about -- about what Hydro's doing today, and then what they plan to do?

MR. BRADY RYALL: I was actually just thinking, because of all the new terminology as to what they plan to do --

DR. BYRON WILLIAMS: Okay. Okay. And my only concern with that is I think it's important to understand what they're doing today, as well --

MR. BRADY RYALL: I see your point.

DR. BYRON WILLIAMS: -- which I think, for the test year, especially, I think that's going to be real important for the Board. That --

MR. BRADY RYALL: Yeah.

DR. BYRON WILLIAMS: For what it's worth, that's our advice.

THE FACILITATOR: I think that's a fair statement. I think that, you know, we want to have clarity, right? We want to make sure that

everybody knows, you know, what the path forward is, but clearly, what is -- what has occurred, what has gone into the preparation of the test years, the CEF, right?

So I think that we need to have that global understanding of that. That's a fair -- fair -- very fair statement, yes.

MR. ALEXANDER BUKALEV: Do you see these two (2) standards that you mentioned, PAS 55 and ISO 55000 as different standards or you treat them as the same standard, basically the same approach for the future?

MR. JOEL WORTLEY: So our -- our intent is not to certify either one, or to rigorously audit ourselves against either one, but rather to use best practices and standards like those as guiding principles.

MR. ALEXANDER BUKALEV: Do you intend to measure the progress against the implementation of the standards in your place, even if you are not considering to be certified?

MR. JOEL WORTLEY: So the -- the GAPP assessment that was done by UMS was done in -- in that spirit, and if -- if there's value in it, it will be repeated in the future to see -- to see how we've

progressed.

MR. ALEXANDER BUKALEV: Do you have a self-assessment questionnaire for this tender that even without UMS, you would be able to measure yourself against the -- the progress?

MR. JOEL WORTLEY: There -- there are self-assessment tools out there. You're probably familiar with several of them. And so -- so certainly that -- you know, that opportunity is open to us.

DR. BYRON WILLIAMS: I know in some of its environmental work, Hydro is standard -- is --

MR. JOEL WORTLEY: Certified.

DR. BYRON WILLIAMS: -- certified. It -- can you help us to understand the choice not to seek certification?

MR. JOEL WORTLEY: So certification comes with a -- a cost, and that cost is not obviously of value at this point. But that's something that can be reevaluated as -- as we go forward.

MR. CHRIS OAKLEY: I have a couple more questions, if we're going to -- not going to be coming back after lunch. I'm -- I'm not sure what -- what you're thinking about as far as that goes, because I had some other questions that I was sort of saving for the afternoon, but if we're going to have

this one (1) shot, I'd...

THE FACILITATOR: Well, I -- I think that probably we might as well just have all the questions now and -- and wrap up the session, and then people can, you know, have lunch so they choose, or leave --

MR. CHRIS OAKLEY: Sure.

THE FACILITATOR: -- at that point in time, so please, feel free, Chris.

MR. CHRIS OAKLEY: Okay. Thanks. A couple of things associated with the corporate value framework, and -- and the Copperleaf implementation. So Copperleaf sort of sets out their -- their expectations for a complete and comprehensive implementation.

At one (1) point, and let's just see where this is actually coming from, I guess it's from the gap assessment report:

> "While the Corporate asset management executive counsel has been chartered with most of the responsibilities of the asset owner, this role has not been formally communicated to the organization, nor have the business units been

provided with concise direction on policy strategy and objectives, although the CAM (phonetic) does have a plan to develop these over the next few months."

Can you confirm if the corporate value framework as described by Copperleaf, and which is critical to Copperleaf C55 implementation, is that concise direction of policy strategy and objectives for Manitoba Hydro? Is that -- the intention is that this is being sort of tailored to work with -- with the Copperleaf product?

MR. JOEL WORTLEY: The -- the corporate value framework is -- is a -- is a decision support tool for capital decision making. The -- and -- and as such, is -- is again, a small subset of the overall larger asset management picture to which UMS is -- is speaking.

And so I -- I wouldn't -- wouldn't bring those two (2) things together in that context.

MR. CHRIS OAKLEY: Okay. So if -- if we were to ask an IR and just say sort of -- we'll set out sort of a concordance, and you can tell us what actually maps and what doesn't, so that we can -- because we have a pretty good understanding about C55,

what -- what their implementation looks like, and we want to understand how that's going to be integrated, because clearly you've got two (2) other business units that haven't really got into it yet, so at least understand your targets going forward.

Risk is always kind of an interesting thing, and -- and corporate -- a corporate-centralized view of risk is really important to make sense of these expenditures, because every business unit looks at risk a different way. If you're in generation, you look at what's the risk of failing -- of a unit failing, or catastrophic dam failure, or that sort of a thing. If you're a distribution person, you're worried about risk of my -- my SAIDI/SAIFI, you know, kV sort of numbers. And -- and call-outs from customers, and things like that.

So again, risk -- this is again taken from the GAPP assessment report:

> "Risk is a key base -- basis for decision making in best practice asset management systems, and Hydro is increasingly incorporating risk in its asset-related decisions. However, there were no corporate risk standards, tolerance levels, or

risk assessment required to guide the business units leading to a situation in which risk is being avoided rather than managed."

So without having those corporate risk standards in place, can you explain how Manitoba Hydro evaluates which risks are to be avoided and which risks are to be managed? And -- and I -- I particularly think about the HVDC group, because they sort of have, sort of like, end-of-the-world scenarios.

And -- and, you know, if -- if the HVDC fails, we're down and out. So they tend to look at valve failures for -- in -- in that light rather than the corporate overview of what happens in that context, so.

MR. JOEL WORTLEY: So I -- I can't give you a whole lot of detail. I think your assessment is -- is pretty correct to say those unusual groups are doing their own risk assessments today and the missing piece as pointed out by the UMS GAAP assessment is that centralization and -- and top down guidance around risk tolerance, that -- those are some of the reasons why we formed the corporate asset management executive council and the steering

committee is -- is to correct some of those -- some of those issues.

With respect to how each of those individual groups looks at risk and -- and how they choose to manage versus buydown risk, those -- those types of questions are probably best answered on a -- on a specific project basis if you want to ask about a specific project.

We can try to answer them a little bit more broadly if you want to ask about specific groups or -- or functions. It would be beyond me to give you a -- a fulsome answer right now.

MR. CHRIS OAKLEY: Okay. We'll probably have a structure IR that actually is going to kind of go after individual pieces of this, because it -- it is a complex answer probably, especially if we ask for current status, because you're obviously in transition right now, so.

Another thing taken from the GAAP -- the GAAP Assessment Report was:

> "The -- the lack of clear communication on acceptable risk tolerances led middle -- middle managers to use their individual perception of risk levels to make

decisions generally resulting in risk avoidance. This risk adverse posture may be too conservative, and therefore, push up the life cycle cost of assets."

And this -- this is from the UMS report. So they're kind of saying, Hey, look at past practice is not getting us an optimal solution, so -- so a concern we have is the CEF that is before us now for the test years is sort of presented as an optimal solution given the limitations. And UMS seems to be saying, is this is not optimal. This is way suboptimal, because there isn't a consistent definition of risk and value across this entire spectrum.

So can you provide us with some examples on how risk assessment is used by Manitoba Hydro in evaluating the appropriate balance between major capital projects, and O&M expenditures, and minor capital. Where's that thinking at now, and how is it actually incorporated?

Is there something simply that the executive council sits down and say, You know, we've got a budget. We've got to make the best use of it, and it looks to us like these are where the risks and

values are. So we're going to take a little bit back from these guys right now and we're going to take some over to these folks.

MR. JOEL WORTLEY: So first off, I -- I think it's fair to say that UMS did not do a detailed evaluation of the CEF. And so their -- their conclusions are -- are more broadly based around the general state of practice. And -- and so in that respect when we look at any individual group and we ask the question of how do we know that they're -- they're being reasonable and -- and the decisions they're making around risk tolerance and allocating their dollars, that -- that transparency from a -- in terms of having a consistent and standard process that's anchored centrally with a corporate risk tolerance isn't there today.

But what is there today is ongoing pressure that's resulting in -- in significant deferral of -- of many projects and many expenses. And so if -- if that -- if that -- if large bodies -- or significant works are being deferred that are carrying significant risks, or risks that are -- that are significant enough to be of -- of some concern, then we've got some comfort that things are not overspent.

But the -- you know, a more objective assessment on a -- on a corporate scale, that's part of the future.

MR. CHRIS OAKLEY: Okay. Thanks. One (1) specifically about generation operations, they -- they particularly noted that outside of dam safety. There's sort of minimal risk assessment performed on the assets. And that was -- you know, that was a bit more specific, just saying, you know, we look at the -- at the generation operations. We don't see anything but dam safety really getting significant risk assessment.

How -- how does that translate into the level of -- of investments being made in generation operations? In other words, if it's not a dam safety related thing we can assume, therefore, that there really isn't risk assessment, considered -- this is -- this is -- it kind of falls back to good operating practice and judgment by the operational folks.

MR. JOEL WORTLEY: So again, you know, as a broad statement considering of all the different asset classes that are managed within generation, there -- there's probably a -- a reasonable observation made there by -- by UMS. But when you -- when you look in a little bit deeper, certainly within

dam safety risk is -- is considered, but when you look at the drive train assets, the -- the generating unit assets that are -- are responsible for directly generating electricity, we've been using loss generation risk as an assessment and -- and prioritization tool for -- for years. And so I don't think it's fair at all to say that it's only within dam safety that -- that risk is being considered.

MR. CHRIS OAKLEY: So have you -- have you ever done a rebuttal to the UMS report that would say -- to say, Well, we challenge some of these findings? Or -- or are you just going to let that report stand on the record as part of the filing, which is where it's at now?

MR. JOEL WORTLEY: There -- there was some back and forth in the generation of -- of that report. We were very cognizant not to write the report for them, and -- and it's a point in time evolving from there.

MR. CHRIS OAKLEY: That's fair. One (1) more question, if I could, about the capacity projects which -- which was -- you know, first of all, just the location of them on the map in some cases is intriguing.

Are the planning standards against

which those capacity constraints were -- were developed on the record anywhere? There was some description in some of the project justifications, but -- but it really doesn't go into, you know, we did an 'N' minus one (1) on non-coincident peak for this season and found this transformer's overloaded.

Best thing to know because, in a cold climate, if we have winter-peaking transformers, I've certainly stood beside absolutely maxed out 150 percent transformers that had snow on top of them. And so normal transformer degradation curves will tell you that you're not doing anything damaging to that transformer, even though it's rate -- it's operating at 150 percent of -- of peak load.

And -- and utilities generally will run transformers into those load ranges in the wintertime, because it's fine. You've -- you've got stil-standing snow. And if you actually measured conductor temperatures, you'd probably find that they're -- you know, they were still below zero, even though they're almost max loaded.

Is all that information available? Do we get to understand the basis of these -- these capacity projects and what's driving them? And again, well, we can kind of pull them out of the -- of the --

I guess it's MFR-115 that -- where they're sort of all listed.

How could we sort of synthesize the planning decisions that drove these things? 'Cause there are some pretty significant dollars, as you -- as you mentioned, in the next two (2) test years on -- on this, so --

MR. JOEL WORTLEY: So those are -- the planning standards exist. They're available. I think some of them may have been filed at some point. I'd have to confirm that.

I can't speak to them off the top of my head, but they're -- they're definitely there, and we should be able to -- to give you the basis for those -- for the -- for those decisions based on those standards. It'll help us if you're very specific in what you're asking for.

MR. CHRIS OAKLEY: Okay. So we -- we maybe should prepare, again, a detailed IR that sort of says, Here's a portfolio of projects that have a similar sort of description. Can you tell us the planning study, or is there is a report, or something like -- or regional planning report that said, We really have to take these assets on right now?

MR. JOEL WORTLEY: Yeah. The more

specific you can be in exactly what you're looking for, the -- the better answer you're going to get.

MR. CHRIS OAKLEY: Okay. Thank you. That's all I have.

DR. BYRON WILLIAMS: I just have -- and this is more a question for Greg and Patti. And you may not be able to answer it, but does the Corporation have any intention of bringing UMS in terms of its application? And -- and if it's premature, that's -- that's fine.

MS. PATTI RAMAGE: I would say it's premature.

THE FACILITATOR: Okay. Well, I think that, unless there are any more questions -- I think we've canvassed a lot of questions here today, and I think this has been an interesting discussion. I hope it's provided some value, and I hope it allows us to move forward into formulation of some IRs and be able to -- to address these matters as effectively as we can going forward, here.

So we appreciate the -- I guess the insight in terms of what parties are looking for, what their expectations are in terms of the information that will be sought in the Information Requests. That's useful for us.

So we certainly thank you for your participation and your willingness to sit down with us and -- and have this interaction on this particular part of our application, and we appreciate that.

Further to that, I think that we're ready to close the session, then, for the day. Lunch is available for those that are wishing to partake. It would be in the boardroom. But again, on behalf of Joel, Patti, and ourselves, we really, really appreciate your attention and interest today. Thank you.

--- Upon adjourning at 12:19 p.m.

Certified Correct,

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Cheryl Lavigne, Ms.